A CHILTON PUBLICATION

the Iron Age

E NATIONAL METALWORKING WEEKLY

April 15, 1954

NTS PAGE 2

NODULAR IRON (MAGALOY) ROLLS really rolling up spectacular tonnage figures . . .

Actual operating records show an average increase of 50% in rolling tonnage by the use of Magaloy (Nodular Iron) Rolls. There are several advantages which account for the steady sales increase of these rolls:

1. Physical properties equal to cast steel rolls.
2. Better machining properties.
3. Better rolling surfaces.
4. Respond to heat treatment.
5. Lower cost per ton rolled than steel rolls.
6. More tonnage per dressing.
7. Wearing qualities of grain rolls.
8. Uniform hardness penetration.

MAGALOY MEANS NODULAR

Nodular Iron is the material developed by International Nickel. MAGALOY is the trade name of Aetna-Standard for rolls made of Nodular Iron.

ROLL APPLICATIONS

For rolling skelp, plates, shapes, structurals, bars, rods and billets, pipe and tube.

AETNA ROLL LINE

Plain Chill	Asex Grain
Moly Chill	Pipe Mill
Nickel Chill	Rubber Mill
Alanite A-B	Plastic Mill

Magaloy (Nodular Iron)

THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.

Aetna-Standard

PLANTS IN WARREN, OHIO • ELLWOOD CITY, PENNSYLVANIA

SUBSIDIARY and ASSOCIATED COMPANIES

Head Wrightson Machine Company, Ltd., Middlesbrough, England — Great Britain, Finland, Sweden, Norway, Denmark, Union of South Africa, Northern and Southern Rhodesia.

Aetna-Standard Engineering Company, Ltd., Toronto, Ontario, Canada.

M. Castellvi, Inc., New York, N. Y. — Mexico, Central and South America.

Societe de Constructions de Montbard, Paris, France — France, Belgium, Holland, Luxembourg, Switzerland.

Demag Aktiengesellschaft, Duisburg, Germany — Germany, Austria, Yugoslavia, Greece, Turkey, Egypt.

Compagnia Italiana Forme Acciaio, Milano, Italy — Italy.

Aetna-Japan Company, Ltd., Tokyo, Japan — Japan.

Hale & Kulqren, Inc., Akron, Ohio — Representative for the Rubber Industry.

Designers and Builders to the Ferrous, Non-Ferrous, Leather, Rubber, and Plastic Industries

GRANULAR BASIC

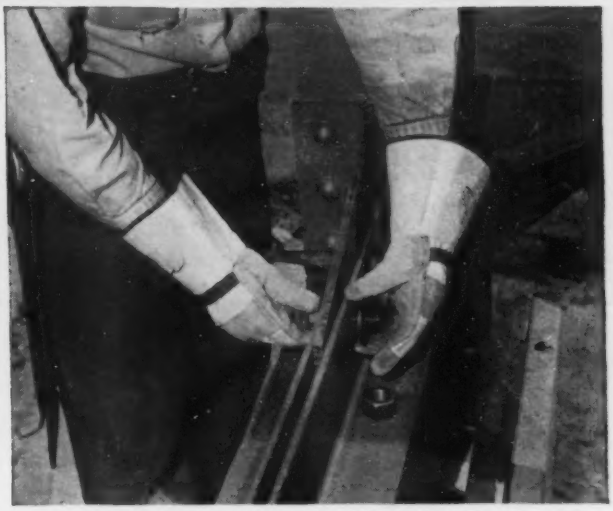
REFRACTORIES

Only through extensive, modern production facilities and by continued product development can we furnish the steel industry with a dependable supply of granular basic refractories—premium products at competitive prices.

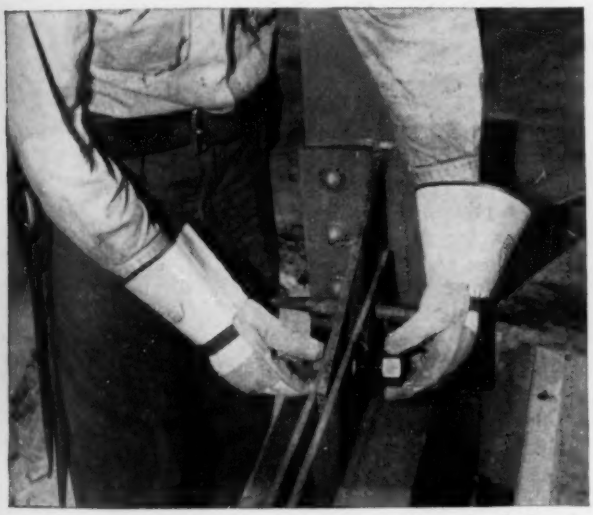
BASIC REFRACTORIES INCORPORATED CLEVELAND 15 OHIO

Here's the quick and easy way to join structural members

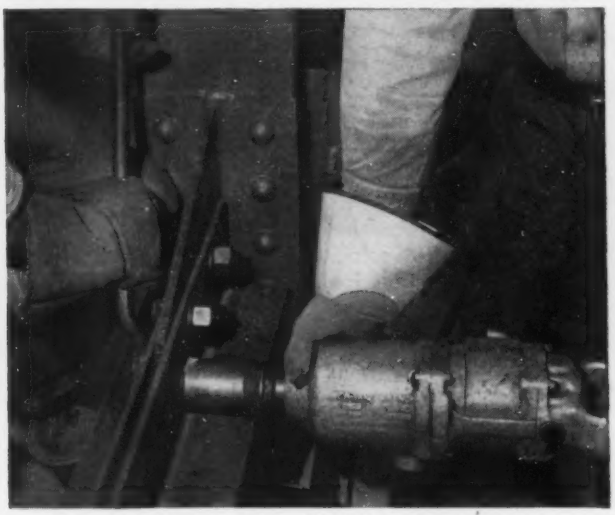
1 The holes are aligned, using one or more drift pins. Then the worker inserts the bolt, placing hardened washer under bolt head.



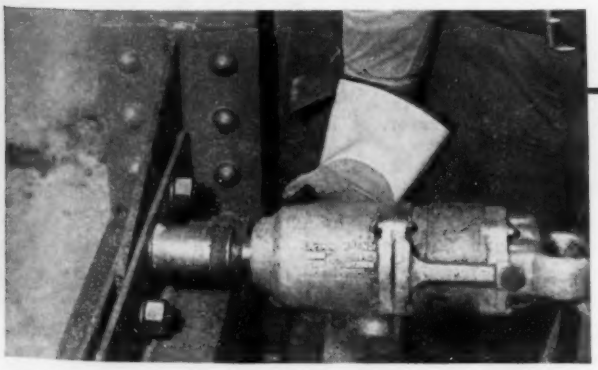
2 Head of bolt is held lightly with fingers as second hardened washer is slipped into place over threaded portion of the bolt.



3 Hexagonal nut is run up on the bolt. At each joint, the initial bolt is tightened sufficiently to keep holes in alignment. Then pins are replaced with bolts.



4 With bolt head held by hand wrench, nut is quickly torqued with pneumatic impact wrench. That's all there is to it! The whole operation takes less than the time to describe it. No wonder this time-saving way of erecting steel with high-strength bolts is growing more popular every day!



◀ *Alternative Method*—The Bethlehem High-Strength Bolt may also be installed by one man. With this method, the nut is first drawn up as far as possible with the hand wrench. Then the impact wrench is used alone.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM HIGH-STRENGTH BOLTS

The Iron Age

Vol. 173, No. 15, April 15, 1954

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NEWS DEVELOPMENTS

HANDICAPPED WORKERS HOLD UP THEIR END — P. 65
Handicapped workers themselves are furnishing long-needed proof that the average employer can hire the handicapped. Alert firms are finding among the nations 6 million handicapped a storehouse of usable skills. Paraplegics Mfg. Co. does contract work for industry's giants—and makes out fine.

GAW TEST CASE COMING AT WESTINGHOUSE — P. 69
Success of the CIO's drive for guaranteed wage may hinge on outcome of negotiations between Westinghouse and IUE. Union has put GAW high on bargaining list. Similar proposal will confront General Electric. But union chances are rated slim. Annual wage may again be a "straw" issue primarily for trading.

TACONITE DEVELOPMENT "REALLY ROLLING" — P. 72
For over 30 years men have talked about extracting the riches in flint-hard taconite. "Now," says one mining official, "we're really rolling." In the past year three mining firms have committed more than $500 million for development of beneficiation plants, even townsites for future workers.

COAST SHOPS TACKLE AUTO PARTS ORDERS — P. 75
Western metalworking shops bird-dogging for business were finally beginning to flush out the automobile business in earnest last week. And the door was wide open as automakers step up their drive to cut costs by developing western suppliers. Freight savings help trim prices. Quality requirements met.

END OF THE ROAD FOR PISTON ENGINES? — P. 82
It's a better than even money bet that when the current tooling programs now underway in the auto industry are completed, it will be the end of tooling for reciprocating gasoline engines. The gas turbine is the logical successor. A styling revolution will come with the change. How soon is the question.

IS AUTOMATION FEASIBLE FOR JOB SHOPS? — P. 93
Automation was once thought to be restricted to high volume industries. Many metalworkers and machine tool people have firmly predicted that it would not be suitable for smaller, job shops. But at least one firm is now working on a small automated honing machine. Design requirements are challenging.

the Week in Metalworking

ENGINEERING & PRODUCTION

NEW LOW-COST COATING PROTECTS STEEL — P. 125
Fast, low-cost application of a new nickel phosphorous coating is claimed to give mild steel corrosion resistance comparable to some stainless steels. It can be applied by brushing, dipping or spraying. An oxide of nickel is reduced on the coated surface. Basic ingredients of the mixture are inexpensive.

PART DESIGN HELPS CUT CASTING COSTS — P. 128
By taking advantage of the patternmaker's know-how, lower casting cost, high production rates and top quality may be obtained. In planning castings, avoid core designs which make foundry production difficult. Aim for simplified rib design. Redesign of pad contour may improve casting soundness.

SEMICONTINUOUS BAR MILL IS VERSATILE — P. 132
Rotary Electric Steel Co. has bet $12.5 million that a fully mechanized, efficiently modern semicontinuous bar mill can retain the desirable versatility of a hand-operated bar mill. Unusual flexibility of equipment and operating methods has improved customer service, retained high bar quality.

HOW NITROGEN AFFECTS GRAPHITIZATION — P. 136
Nitrogen dissolved in aluminum killed steel inhibits graphitization, recent studies made by U. S. Steel Corp. have shown. Failure of welded molybdenum steam pipe in service as a result of graphitization set metallurgists hunting for the "how and why" of this problem. Combined as Al N. nitrogen does not affect graphitization.

NEXT WEEK—HOW TO TOOL FOR COMPETITION
More competitive business conditions have placed increasing responsibilty on both designers and users of machine tools and tooling. To aid in meeting the new metalworking problems, THE IRON AGE, in next week's special issue, brings you a series of thoughtful articles written by industry experts.

Here are ideas you can put to profit in your own plant. Some of the subjects discussed include: Latest developments in plastic tooling; how to get more from your presses; an evaluation of high and low speed machining; how automation can show profits on short runs; use of progressive die setups.

MARKETS & PRICES

BANKERS, BUSINESSMEN SEE RECESSION END — P. 71
A recent panel meeting of bankers agreed that inventory adjustment is only part of today's business problem. Consensus was that the slower tempo results from the swing down from an inflated economy to a balanced one. Manufacturing executives foresee an upturn by midyear.

IKE SEEKS STREAMLINED FOREIGN TRADE — P. 77
Congress now has the chance to decide whether the economic understanding of the free countries is to be preserved, or whether Russia will be allowed to split them along trade lines. Opportunity is presented by the President's request for 3-year extension of the Trade Agreements Act.

CONGRESS STAYS WARY ON TRADE WITH REDS—P. 87
Trading in non-military commodities between the U. S. and the communist areas may be inevitable in the long run. But Congress is far from convinced. The Foreign Operations Administration wants to open up what it calls "non-strategic" trade. What Congress wants is a definition of "non-strategic."

BUSINESS WILL PICK UP BY SEPTEMBER — P. 95
Our current mild recession will continue for several more months, but there won't be an economic crisis. There will be a significant business upturn early in September. Steel production during first 6 months of 1954 will be 15-20 pct off '53 average. Rest of metalworking output will be 10-15 pct below '53 highs.

STEEL MARKET SEEMS TO HAVE HIT BOTTOM — P. 153
Steel market signs indicate that the bottom of the recession has been reached. Yet there is little prospect of sharp recovery in the near future. Wage negotiations in May and June furnish most hope for substantial pickup in buying. Inventory correction continues, but is becoming less of a market factor.

SEE STATE DEPT. "NO" ON BOLIVIAN TIN — P. 156
Washington sources now report it's almost certain State Dept. will turn thumbs down on proposal that U. S. renew Bolivian tin contract. Serious obstacles to the renewal are the Administration's position on shutting down the Texas City smelter and the U. S. tin surplus now at 40,000 tons and growing.

No. 1-B electric vibrating Feeder—for small-capacity operations up to 3500 pounds per hour. Ideal for laboratory use.

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DRYERS **CONVEYORS**
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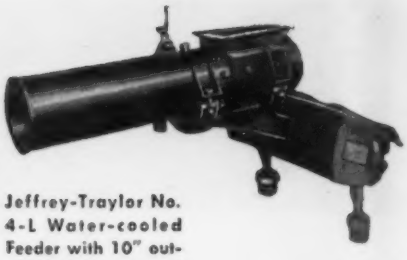
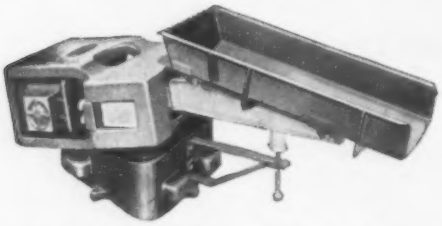
Literature Available

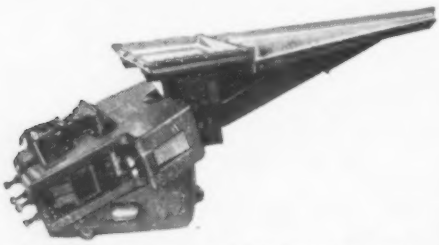


Jeffrey-Traylor No. 4-L Water-cooled Feeder with 10" outside diameter x 4' long water-jacketed deck. For feeding to high temperature furnaces or for handling extremely hot materials.



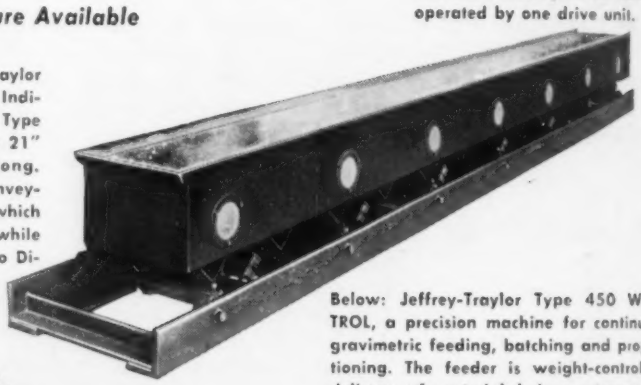
Jeffrey-Traylor No. 3 electric vibrating spark-proof Feeder with 12" x 30" open-pan deck. For feeding operations in hazardous atmospheres or under extreme moisture conditions.

M-V Mechanical Vibrating Conveyor for conveying abrasive, lumpy or rough materials, hot or cold, dry or wet, as well as fine materials. Up to 80' can be operated by one drive unit.

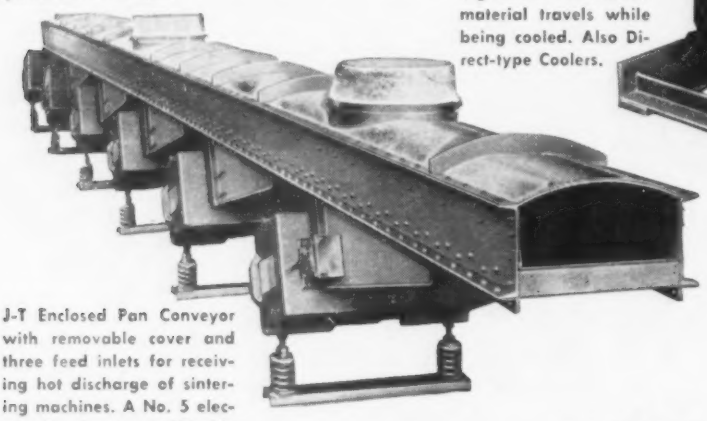


Jeffrey-Traylor electric vibrating Spreader Feeder, 14" wide x 70" long with one edge tapered to spread to 55" width.

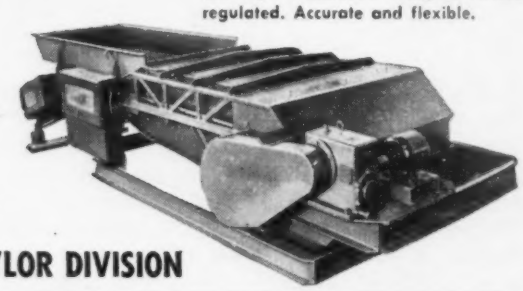
Right: Jeffrey-Traylor electric vibrating Indirect-type Cooler. Type HI-21F open type 21" wide and 18' long. Has solid plate conveying surface over which material travels while being cooled. Also Direct-type Coolers.



Below: Jeffrey-Traylor Type 450 WAY-TROL, a precision machine for continuous gravimetric feeding, batching and proportioning. The feeder is weight-controlled, delivery of material being automatcally regulated. Accurate and flexible.



J-T Enclosed Pan Conveyor with removable cover and three feed inlets for receiving hot discharge of sintering machines. A No. 5 electric vibrating type, 25" wide x 45' long.



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Society of Business Magazine Editors

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"Quick, Jeeves, the Sulfur and Molasses"

WHAT with the birds, the bees, the daffodils and the garden backaches this is the time to do something foolish. Most people do; that's what makes the world go around and your sales climb. If people used only their intellect we would be back to the industrial dark ages.

But for the benefit of some youngsters maybe we should say that this is sulfur and molasses time. We used to get a good lick of that stuff. It was supposed to clean us out, thin our blood and put us in shape for things to come. It usually did but for different reasons.

We were so glad to get it over with that after the operation wore off things really looked good and we acted accordingly. Spring and a change of pace put us in a good frame of mind to skip the dour look and the edgy attitude.

That's the way things are now—for those who want to take their sulfur and molasses and get it over with. We have had a depression that wasn't there. We had no serious recession. Competition is keeping most firms so busy they quit worrying about the Federal Reserve Board Index.

We are coming out of a "correction," a "thing" or if you like a mild recession. By this September you will look back and say that the turn came about Easter time.

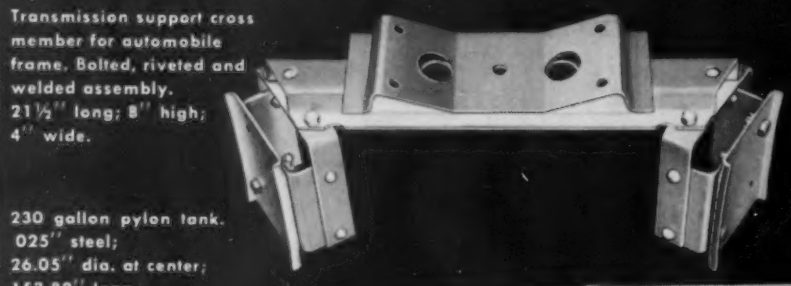
Steel business hit bottom last October or November. It has been improving since that time. March brought a balance between orders and output for many firms. Steel output is on its way up. Average for the year will be more than 75 per cent of capacity—a high level when you figure that 15 per cent is for "emergencies."

Other divisions of metalworking are taking the same trend as steel —with some further advanced. There is no boom in sight but we are heading into slow but definite improvement in output and orders.

As far as we are concerned the lull is about as low as it is going to get and things are looking up. We have had our sulfur and molasses —have you?

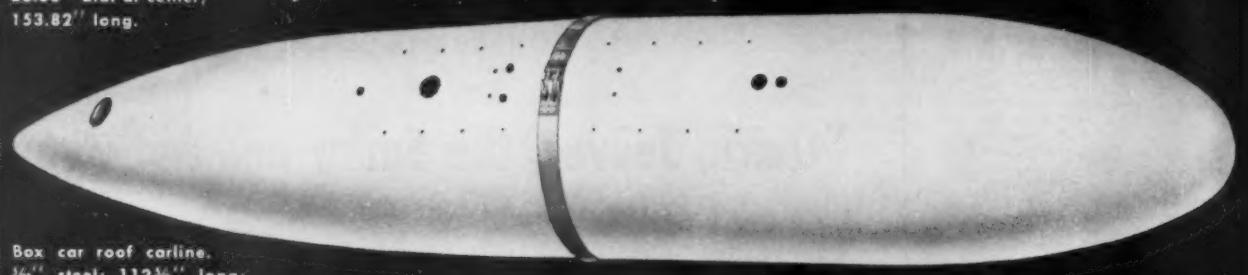
Tom Campbell

Editor



Transmission support cross member for automobile frame. Bolted, riveted and welded assembly. 21½" long; 8" high; 4" wide.

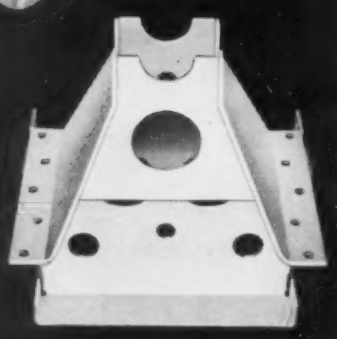
230 gallon pylon tank. .025" steel; 26.05" dia. at center; 153.82" long.



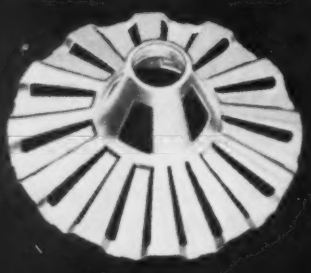
Box car roof carline. 3/32" steel; 112⅜" long; 4½" deep at center.

Shaft bracket. .1345" steel; 8⅛" long; 6½" wide; 1 1/16" flange.

Welded bracket. 3/16" low alloy steel; 15¼" high; 12¾" wide; 11¼" deep.



Diffuser for commercial oil burner. 5/64" stainless steel; 11" dia.; 3⅜" deep.



Deep drawn body. .0747" steel; 6½" deep; 11 1/16" dia.

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Dear Editor:

Letters from readers

Micromerograph

Sir:

In reading your Jan. 7 issue we note with interest a piece of equipment called a Micromerograph. According to the article on p. 337 this equipment can be used for the analysis of small particles (such as might exist in contaminated hydraulic fluids).

Not being familiar with this particular instrument or its manufacturer, we would appreciate learning all we can about it.

J. N. STANFORD
Power Plant & Mech. Section Engineer

Douglas Aircraft Co., Inc.
Santa Monica, Calif.

The manufacturer of the Micromerograph is Sharples Corp., Bridgeport, Pa.—Ed.

Wrist Radio

Sir:

In your Mar. 25 issue you show a picture of a potential wrist radio. If you have any more available data, I would greatly appreciate it.

H. W. BOLGER
Director of Purchases

Cook Electric Co.
Chicago

This unit is being developed for the U. S. Army Signal Corps and further details must necessarily come from them.—Ed.

New Trepanning Lathe

Sir:

On p. 129 of the Apr. 1 issue of THE IRON AGE appears the article entitled "Bore Heavy Tubing Faster On New Trepanning Lathe" and on pp. 130 to 133 is the article "Test Determines Presence of High Residual Stresses in Stainless."

Because of their interest, we would like to distribute these articles to our members and your permission to reprint would be very much appreciated. Proper credit would be given.

J. R. DERRICKSON
Executive Secretary

Formed Steel Tube Institute
Cleveland

Cleaning Ferrous Metals

Sir:

We have read the article on metal finishing appearing in your Jan. 7 issue. From p. 341, "Better Cleaning Methods Tried," we quote as follows:

"A method of high-temperature cleaning of ferrous metals was also among the patents issued. Surface oxides and carbonaceous matter are removed by exposing the metal to a temperature in the range of 670° to 1700°F in an atmosphere which contains one gas to oxidize carbon and another gas to deoxidize iron oxide. Thus, the carbonaceous matter and iron oxide are removed simultaneously."

We would be greatly appreciative of any information relating to or with regard to the patent or patent number referred to above.

J. W. HELMS
Advertising & Public Relations Manager

Parker Rust Proof Co.
Detroit

We refer to U. S. Patent No. 2,625,495 by C. Cone and J. Huebler who assigned the patent to Surface Combustion Corp. This patent was issued Jan. 13, 1953.—Ed.

18-8 Wire

Sir:

We would greatly appreciate it if you would send us six tear sheets of the article "How Cold Work, Heat Treat Change Properties of 18-8 Wire" by Samuel Storchheim, which appeared in the Feb. 18 issue.

C. YEAGER
Librarian

Sylvania Electric Products, Inc.
Bayside, N. Y.

High Purity Chromium

Sir:

Please send me six reprints of the article entitled "High Purity Chromium—Key to Better Alloys" appearing in your Jan. 21 issue.

J. F. COLLINS

Electro Metallurgical Co.
Niagara Falls, N. Y.

Pressure Furnaces

Sir:

I would like to receive three sets of tear sheets on your article "Pressure Operation Grows in European Blast Furnace Practice" which was published in your Jan. 28 issue, p. 128-132.

T. M. JINDRA
Plant Librarian

U. S. Steel Corp.
Chicago

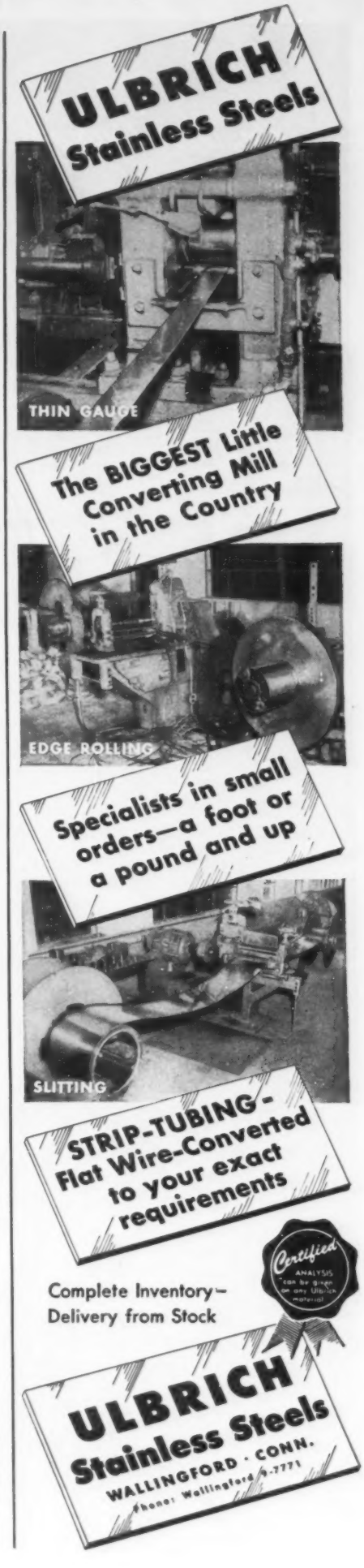
Automatic Process Control

Sir:

We would appreciate receiving three copies of the reprint "Automatic Process Control" contained in pp. 273 to 320 of your Oct. 8, 1953 issue.

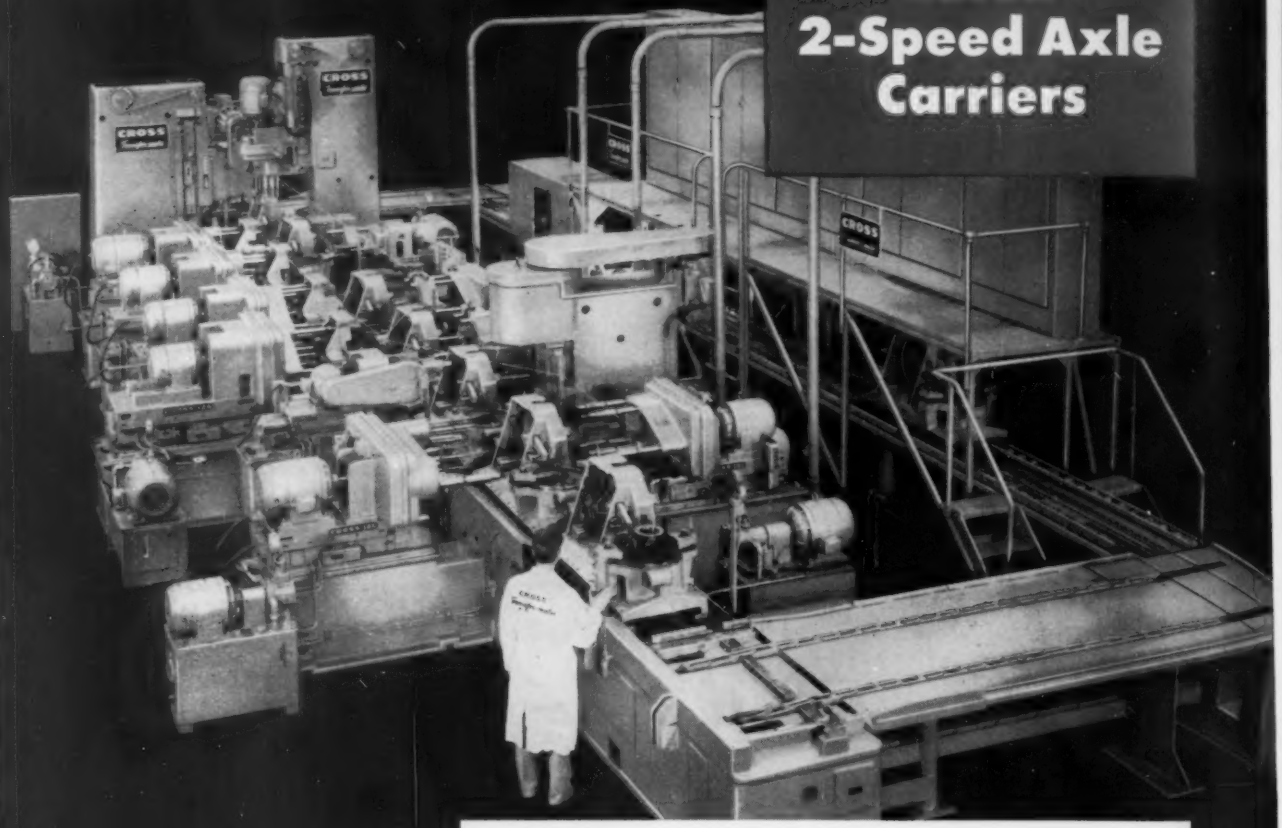
E. C. SMITH

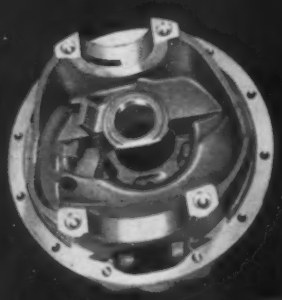
Delaware Valley Engineering Co.
Philadelphia

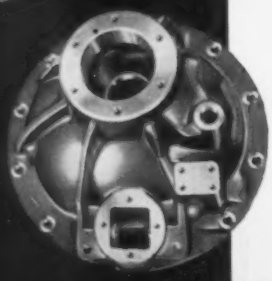


Another Transfer-matic by Cross

Mills, Drills and Taps Eaton 2-Speed Axle Carriers







★ 53 parts per hour at 100% efficiency—capacity for spiral bevel or hypoid style carriers.

★ 97 operations: 60 drilling, chamfering and reaming; 5 milling; 4 spotfacing and counterboring; 28 tapping.

★ 9 stations: 1 loading, 1 unloading, 7 machining.

★ Two-position, progressive type work holding fixtures with automatic transfer from station to station and integral conveyor for automatic return from unloading to loading station.

★ Cleaning unit for removing chips from fixtures between unloading and loading station.

★ Other features: Complete interchangeability of all standard and special parts for easy maintenance; construction to J.I.C. standards; hardened and ground ways; hydraulic feed and rapid traverse; individual lead screw feed for tapping; coolant system; automatic lubrication.

Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

Fatigue Cracks

by William M. Coffey

Any Qestions?

A certain professor in Western Australia, Professor Walter Murdoch, says there are 253 words in the English language beginning with the letter Q. There are also 198 words in which the letter Q occurs, though not as the initial letter—such as "inquire." And in every one of these 451 words the letter Q is followed by the letter U.

The only known exception, the professor points out, is the Australian airline's name "Qantas."

Now, he further points out, everybody pronounces "Qantas" as if it were spelled "Quantas", which proves that the "u" is quite superfluous. If we say "Qantas", then why not "Qantity" or "Qadrupled"?

Implications are far-reaching. Lockheed painters calculated that they are saving 3 hours, 12 minutes, 42.5 seconds in painting the Qantas name on the airlines new Constellations. Similiar savings are available to sign painters, neon tube benders and publishers.

"If you glance through your IRON AGE", the Prof. says, "you will be staggered to find how many times this unnecessary letter is used in every issue. Believe it or not, the press of Britain and the U. S. wastes on this meaningless extra a little over 16 gallons of printer's ink per week; and the paper occupied by it amounts in the course of a year to 6 acres, 2 rods, 7 perches. I am at present engaged on an investigation into the time spent by the world's army of compositors on the printing of this luxury letter. When I know the amount, exact to three decimals, I promise to let you know . . ."

Any qestions?

Book Reviews

The Government Printing Office keeps our library well supplied with the kind of books you like to curl up with. Here's a few more they've recently published:

EFFECTIVE USE OF DENTAL ASSISTANTS ..... 5¢

" . . . how to reduce the physical and mental strains usually suffered by doctors (*doctors?*) treating large numbers of patients."

LIFE HISTORIES OF NORTH AMERICAN WOOD WARBLERS $4.50

" . . . notes on mating habits, migration, nests and other points of interest."

AUTOMOTIVE LIFTS .....10¢

They mean jacks.

SNOW LOAD STUDIES ....20¢

We heard, too, that in Paris American companies are up to their usual efficiency tricks. I.B.M.'s offices have little signs shouting "Reflechissez" all over the place. That means "Think" in French.

Inside The Iron Age

Here's really good news. We have reduced our subscription price from $8 a year to $5—and have instituted a brand new price of $8 for *two* whole years, 104 issues. So now you can get two big years for your eight bucks—where formerly you only got one year! Keep this in mind when your subscription comes up for renewal. *(Wish they'd do the same to the price of coffee!)*

Incidentally, if you were on our active list prior to April 1st you get another lucky break, too, because we are extending all expiration dates based on the new price. This means extra issues for everybody!

Keep sending the money.

Puzzlers

That racing driver trying to average 60 mph on a 2-mile track (March 25 Puzzler) better fold up his Mercedes and go home. Because he won't be able to do it. It's impossible unless he goes at a theoretical infinite speed and that's untheoretical. Winners: Kenneth Hofer, H. J. Roth, George L. Deschambeau, Mark Perucich, Nancy McCormick, Donald Lasof, Francis E. Fitzgibbon, Harry Wunsch, Richard W. Murphy, M. C. Wallis, B. Korges, N. P. Holland, F. Anderson, H. A. Donovan, Leo Chaite, P. L. Barnler, George Hawkins, N. J. Stevenson, R. Stewart, H. E. Denman, J. G. Grimes, C. E. Arntsen, L. T. Sheppard, R. G. Henry, D. G. Coleman.

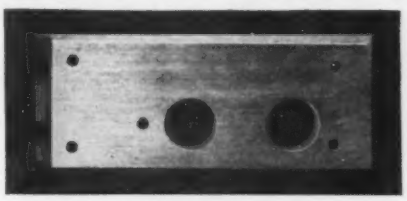
New Puzzler

The second hand on an ordinary circular type wrist watch measures ½ in. from the pivot to the outside end of the hand. How many land miles does the outside end of the hand travel, in its normal circular motion, for the period of a normal year?

How Diebold, Inc.

keeps their SAFES SAFE from rust

This part from a Diebold safe door was covered with fingerprint neutralizer, then spotted with synthetic perspiration. In a matter of days destructive rust was apparent.



This Diebold safe door part was spotted with synthetic perspiration, covered with fingerprint neutralizer, then wrapped with Marvellum VPI. At the end of the test there was no indication of rust. The part was in the same excellent condition as the day it was made.

with MARVELLUM vpi® WRAP

No wonder, after the tests shown above, Diebold Inc. chose Marvellum VPI® Wrap to protect their safes from rust. All ferrous metal parts are now kept wrapped from the moment they are made and each safe . . . large or small . . . is protected by Marvellum VPI before and during shipment. A special coating on the VPI paper vaporizes . . . forms an invisible protective film that positively prevents rust.

Marvellum VPI is easy to use . . . just fold the paper over the part. No need for time-consuming slushing or greasing. No mess or costly cleaning when the item is unwrapped. It's bright and clean, ready for immediate use.

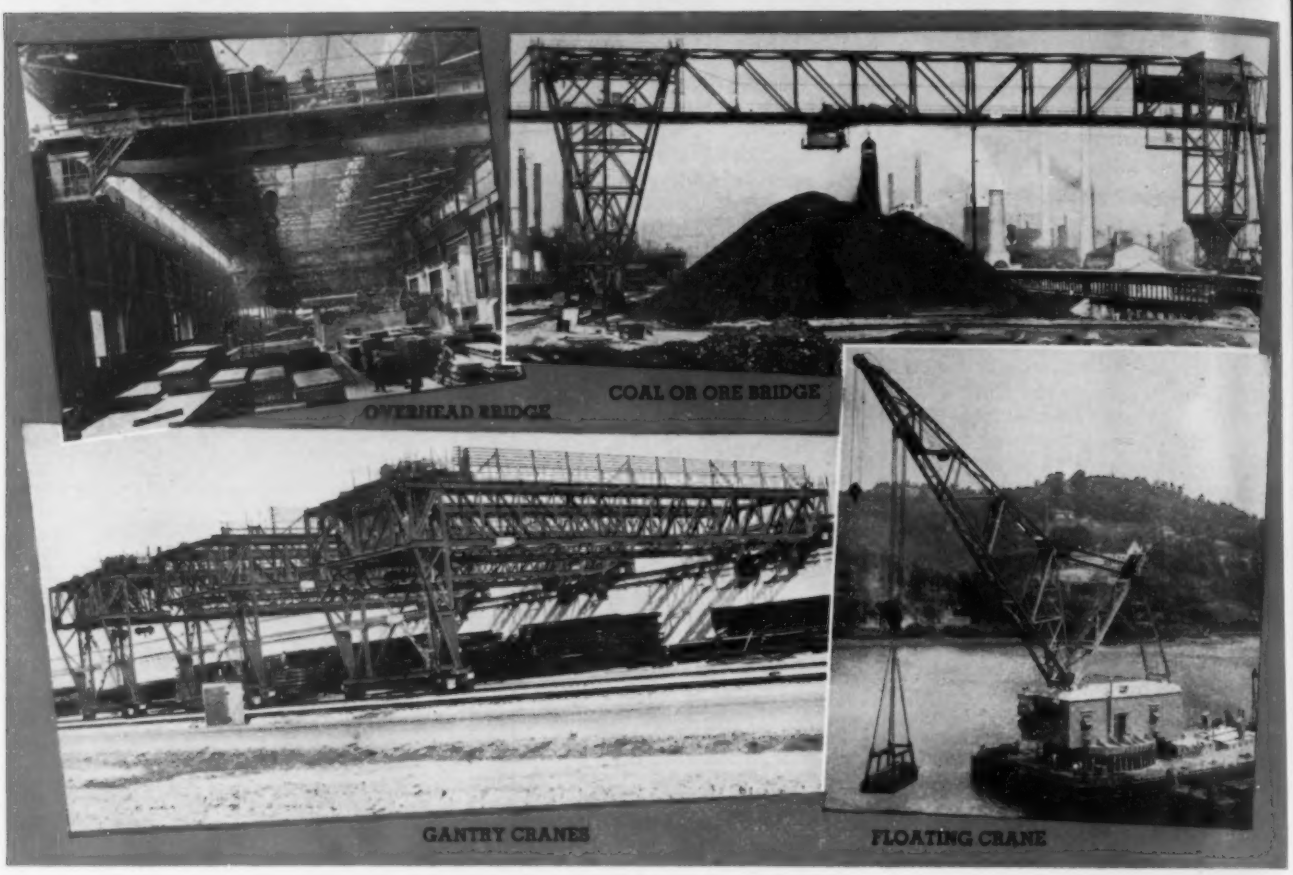
You'll find many uses for Marvellum VPI in your plant . . . wrap steel parts, protect inventories, line tote boxes.

Marvellum VPI is available in rolls of 20, 30, 40 and 60 lb. paper stock and *can be individually imprinted with your trademark* on quantity orders. Envelopes, sheets, bags, shrouds and tubes are also available.

FREE BOOKLET
Gives you all the facts.
Send for your copy today.

The Marvellum Company
2 Appleton Street Holyoke, Mass.

CLARK CRANE CONTROLS



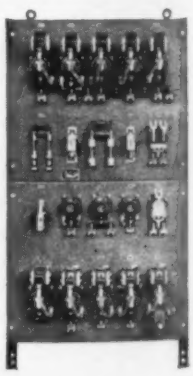
• BETTER PERFORMANCE • LESS MAINTENANCE • GREATER SAFETY — *for any type of crane*

Of the many outstanding performance, maintenance and safety features built into CLARK Crane Controls, three are especially important:

1. The VARI-TIME PRINCIPLE. Smooth, rapid "definite-time" acceleration is achieved by the famous CLARK VARI-TIME core, guaranteed trouble-free for the life of the equipment. This is built as an integral part of the "RT" contactor for the ultimate in simplicity, or furnished with the "VT" relay—a relay built like a contactor. It greatly simplifies the circuits.
2. The CLARK Plugging Relay used on the Bridge and Trolley Control is completely foolproof, and cannot get out of adjustment. It prevents equipment abuse and eliminates needless use of the foot brake.
3. The CLARK Hoist Control features a circuit designed and interlocked to prevent opening of the armature-series-field circuit for protection during lowering.

Many additional features contribute to fast, dependable performance and consistent, trouble-free service.

Typical CLARK Crane Hoist Control Panel.



If you have a crane control problem, consult your nearest CLARK representative or write us direct.

ENGINEERED ELECTRICAL CONTROL

THE CLARK CONTROLLER CO.

1146 EAST 152ND STREET, CLEVELAND 10, OHIO

Dates to Remember

Meetings

APRIL

AMERICAN ZINC INSTITUTE, INC.—Annual meeting, Apr. 20-21, Statler Hotel, St. Louis. Institute headquarters are at 60 E. 42nd St., New York.

CASTER & FLOOR TRUCK MANUFACTURERS ASSN.—Spring meeting, Apr. 20-22. Association headquarters are at 27 E. Monroe St., Chicago.

AMERICAN GAS ASSN. — Distribution, motor vehicles and corrosion conference, Apr. 20-23, Mount Royal Hotel, Montreal. Association headquarters are at 420 Lexington Ave., New York.

NATIONAL SCREW MACHINE PRODUCTS ASSN.—Industry national meeting, Apr. 21-23, Statler Hotel, Detroit. Association headquarters are at 2860 E. 130th St., Cleveland.

EXPOSITIONS

AMERICAN SOCIETY FOR METALS—Apr. 22-24, Hotel Seneca, Rochester, New York. Society headquarters are at 7301 Euclid Ave., Cleveland.

METAL POWDER ASSN.—Annual meeting, Apr. 26-28, Drake Hotel, Chicago. Association headquarters are at 420 Lexington Ave., New York.

AMERICAN SOCIETY OF TOOL ENGINEERS — Annual meeting & biennial Industrial Exposition, Apr. 26-30, Philadelphia. Society headquarters are at 10700 Puritan Ave., Detroit.

AMERICAN FOUNDRYMEN'S SOCIETY —Annual Foundry Congress & Show, May 8-14, Public Auditorium, Cleveland. Society headquarters are at 616 S. Michigan Ave., Chicago.

LEAD INDUSTRIES ASSN. — Annual meeting, Apr. 22-23, Drake Hotel, Chicago. Association headquarters are at 420 Lexington Ave., New York.

FARM EQUIPMENT INSTITUTE — Spring meeting, Apr. 23-24, Biltmore Hotel, Atlanta, Ga. Institute headquarters are at 608 S. Dearborn St., Chicago.

AMERICAN MANAGEMENT ASSN. — Manufacturing Conference, Apr. 26-28, Statler Hotel, Cleveland. Association headquarters are at 330 W. 42nd St., New York.

ASSN. OF CONSULTING CHEMISTS & CHEMICAL ENGINEERS, INC.—Apr. 27, Belmont Plaza Hotel, New York. Association headquarters are at 50 E. 41st St., New York.

GRINDING WHEEL INSTITUTE — Spring meeting, Apr. 28-May 1, The Homestead, Hot Springs, Va. Institute headquarters are at 2130 Keith Bldg., Cleveland.

MAY

ANTI-FRICTION BEARING MANUFACTURERS ASSN., INC.—Annual meeting, May, Westchester Country Club, Rye, New York. Association headquarters are at 60 E. 42nd St., New York.

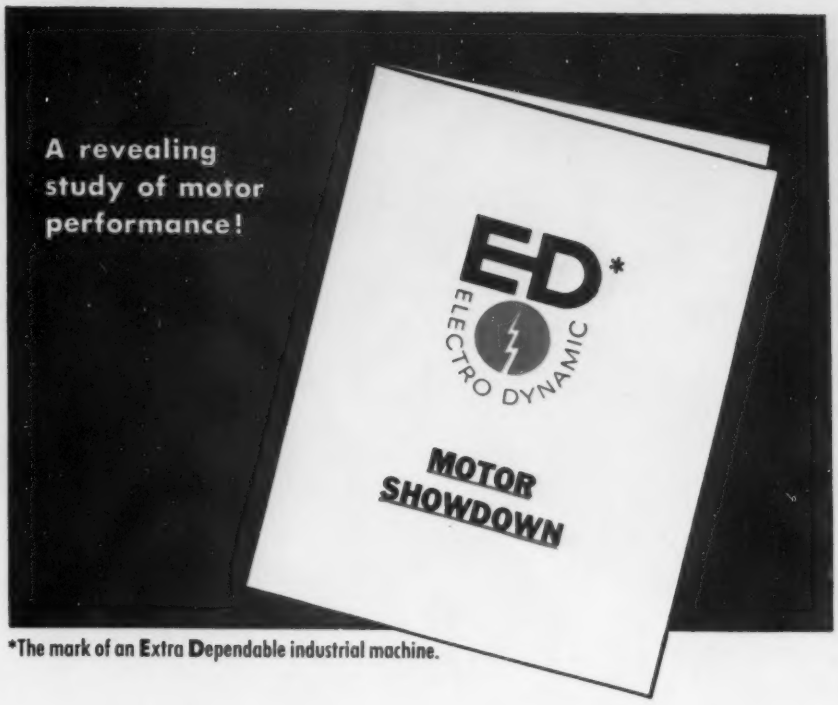
AMERICAN STEEL WAREHOUSE ASSN. — Annual meeting, May 2-4, Drake Hotel, Chicago. Association headquarters are at 442 Terminal Tower, Cleveland.

NATIONAL ASSN. OF SHEET METAL DISTRIBUTORS—Spring meeting, May 2-4, Roosevelt Hotel, Pittsburgh. Association headquarters are at 1900 Arch St., Philadelphia.

NATIONAL TOOL & DIE MANUFACTURERS ASSN.—Spring meeting, May 2-4, Statler Hotel, Washington. Association headquarters are at 907 Public Square Bldg., Cleveland.

ELECTROCHEMICAL SOCIETY — Annual spring meeting, May 2-6, La Salle Hotel, Chicago. Society headquarters are at 235 W. 102 St., New York.

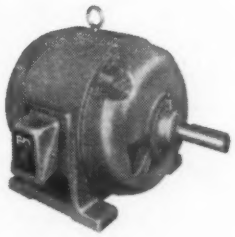
CONCRETE REINFORCING STEEL INSTITUTE — Annual meeting, May 3-8, The Boca Raton Hotel, Boca Raton, Fla. Institute headquarters are at 38 S. Dearborn St., Chicago.



*The mark of an Extra Dependable industrial machine.

THIS CANDID REPORT UPSETS MANY IDEAS ON MOTOR SELECTION

FOR METAL WORKING MACHINES



1 to 250 hp. AC and DC. Standard or special purpose. N.E.M.A. standards.

The results of comparative performance tests* on production line models of different makes of electric motors are reported concisely in a new booklet entitled **"MOTOR SHOWDOWN"**. The facts revealed are of real importance to anyone concerned with motor selection, because the makes of motors tested power over 90% of the electrically operated machinery in *your* industry. Mail the coupon below for your copy.

*Tests certified by J. Arthur Balmford, Professor of Electrical Engineering at a leading Eastern university

ELECTRO Extra DYNAMIC Dependable motors

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154 Avenue A, Bayonne, New Jersey

Please send me a copy of "MOTOR SHOWDOWN" and the new catalog of Electro Dynamic industrial motors.

ED MOTOR SHOWDOWN

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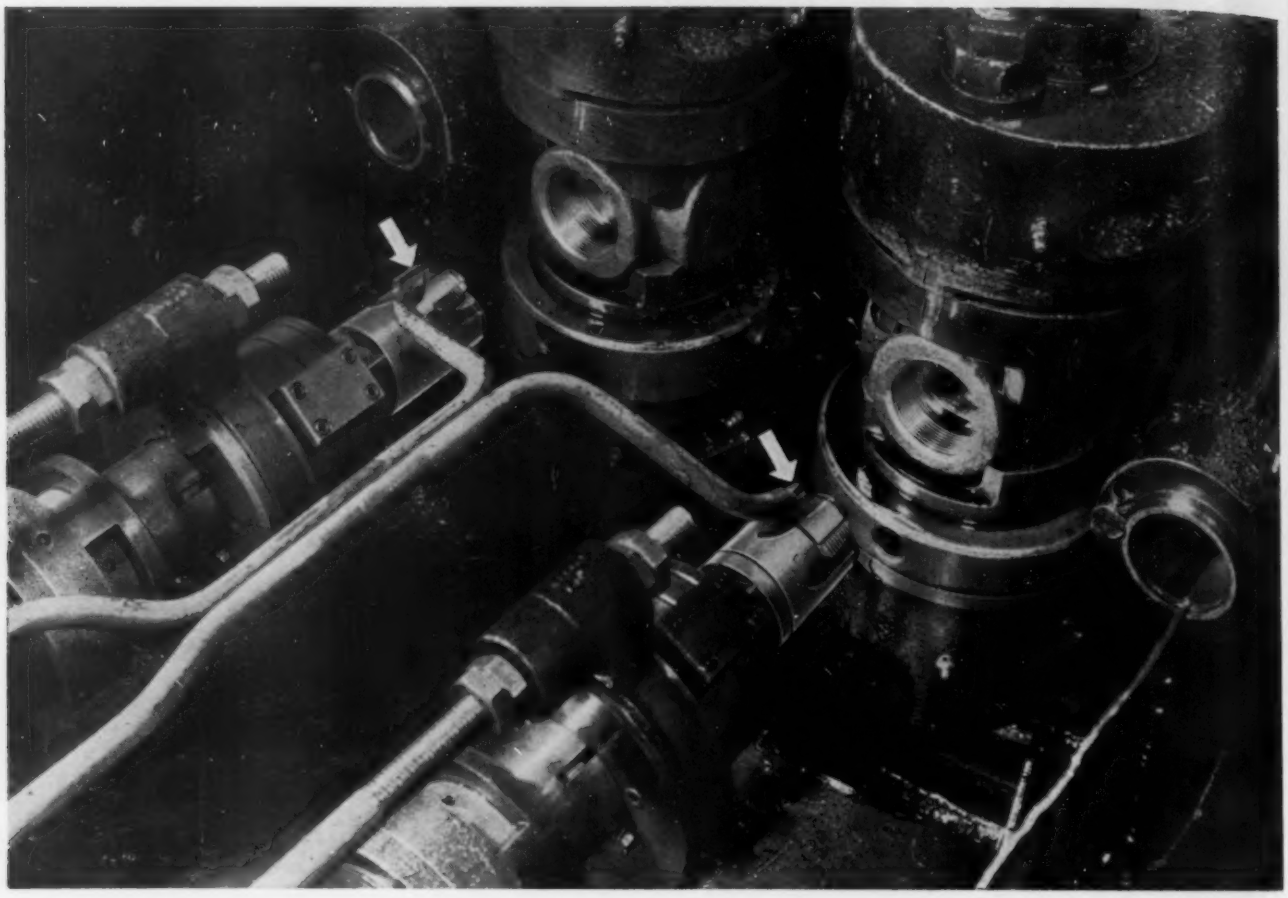

LANDIS TAP MASS-PRODUCES THREADS RATED FOR 6,000 POUNDS PRESSURE!!

W-S forged steel pipe fittings guarantee the uninterrupted flow upon which the economy and safety of modern service and process piping lines depend. LANDIS Taps are regularly used by the Watson-Stillman Fittings Division, H. K. Porter Company, Inc., of Roselle, N. J., to cut the precision threads in these fittings required to withstand high pressures without leak.

In the illustrations, LANDIS LL Rotary Taps on a special drilling and tapping machine are threading W-S 2" 90° Pipe Elbows. 2" 11½ pitch ASTP threads are tapped in steel forgings at the rate of 35 surface feet per minute. Even at this speed 4000 threads are completed between chaser grinds, holding tool cost and downtime to a minimum.

LANDIS LL Taps are designed for the high-speed production of precision tapered threads. The taper of the threads is mechanically controlled by the receding action of the chasers. Cutting strains are thereby reduced, thread accuracy and finish improved, and chaser life lengthened. The design of the ALM Head features unevenly spaced chasers which provide maximum rigidity and prevent chatter.

Detachable heads allow each size of Tap to produce a wide range of thread diameters. For example, the 2" LL Tap with different size heads will cut pipe threads from 1" to 2½". Both Rotary and Stationary models are built in sizes up to 13⅜".

For further information, send specifications and ask for Bulletin G-95.

LANDIS *Machine* COMPANY · WAYNESBORO PENNSYLVANIA

The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

ASSEMBLY LINE TECHNIQUES in aircraft factories are saving labor and floor space. A production line on a "U" turn, has reduced labor on one jet plane by more than 3000 man-hours per month. Automatic assembly line in one engine plant uses half former floor space.

A HOT PRESSED SYNTHETIC MICA recently developed may become important in vacuum tube applications. This nonstrategic material contains chemicals readily available to private industry. Product may be a forerunner of a U. S. supply of electrical grade synthetic mica adequate to meet emergency demands.

COAST GUARD REPORTS OF HEAVY ICE at lake head and forecast of below normal April temperatures is not expected to delay opening of the Great Lakes ore shipping season. Pittsburgh Steamship Co. is going ahead with plans to put its 59-vessel fleet on scheduled runs starting April 19th.

A SIMPLIFIED APPARATUS FOR ANALYSIS OF CARBON in metals recently developed has a precision equal to that obtained with high vacuum equipment, it is reported. The method can be applied to a variety of metals other than iron and steels.

A PRACTICAL GAS TURBINE FOR THE AUTO INDUSTRY is within the foreseeable future. So much progress has been made in solving major engineering problems that industry is facing its biggest $64 question in many years: Will any company tool up for a completely new reciprocating engine?

AN ALL-IN-ONE HYDRAULIC POWER SYSTEM for your automobile may be in your new car future. Power brakes, power steering, wipers for wrap-around windshields have jumped power demands sharply. Solution may well be a single hydraulic system which would run all powered units.

LOOK FOR WIDER USE OF CONTRAST LIGHTING on highways. It's industry's answer to problems arising from present types of lighting used. The new system, already being tested, uses gas tubes instead of tungsten filaments.

ACCURATE, HIGHLY SERVICEABLE PLASTIC checking and locating fixtures can be made in 24 hours using recently developed techniques. Weight savings of 50 pct or more are possible. Special coatings give the plastic fixtures hard wear-resistant surfaces.

WIDER USE OF DIAL FEEDING DEVICES on presses marks a trend toward development of the "automatic factory" in every small plant. Equipped with hoppers and using simpler tooling, the units combine a variety of press, assembly and inspection operations.

PRECISE CONTROL IN QUENCHING is just as important as accurately controlled heating for many steel parts, heat treaters have found. Many shops, both private and commercial, have already modernized equipment for better control, and others are showing a strong trend in this direction.

TARGET OF OUR EFFORTS

Prompt attention to orders . . .
Exact compliance with specifications . . .
Rigid adherence to delivery dates . . .
Means **CUSTOMER SATISFACTION**—
The one consideration that governs policy and practice at

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The Iron Age
FOUNDED 1855
News Section

Industry Gets Help From The Handicapped

Nation's 6 million disabled a storehouse of skills . . . Alert firms find paraplegics, amputees, the blind easy to train . . . Many become production pacesetters—*By K. W. Bennett.*

How handicapped are the physically handicapped?

They don't want sympathy. They'd rather have jobs. In the year 1953, in the state of Illinois, the U. S. Employment Service placed about 9900 physically handicapped persons in productive jobs. At least double that number applied for work but couldn't be placed. At the same time, in metropolitan Chicago, handicapped persons working in their own homes on industrial piece work netted $58,000 in wages.

No Handicap To Success

Estimates have put the total of severely handicapped in the nation at about 6,000,000. There's little information available as to the proportion of these people who are employed, but the number seems to be very low. Nor is much known about the various causes of disability, but it's believed there are about 1,500,000 arthritis cases who are potentials for some kind of rehabilitation work; 200,000 multiple sclerosis cases; 82,500 paraplegics; 400,000 amputees; 500,000 hemiplegia cases; 870,000 potentially handicapped heart disease sufferers.

And the list should be expanded to cover loss of sight, hearing, speech disorders, rheumatic fever, arrested tuberculosis, cerebral palsy, and poliomyelitis.

A badly needed example of the value of "handicapped" people at work is an electronics assembly plant in Franklin Park, Ill. The Paraplegics Manufacturing Company has done contract work for such firms as Western Electric, Allied Radio, Admiral, Teletype Corp., and Naval Ordnance. As a rough going ratio, 80 pct of its work force are physically handicapped persons.

The firm, set up in a renovated screw machine plant in 1951 by two paraplegic veterans, swung into defense work immediately. By 1953 it was doing almost a half-million-dollar business, after a four-fold expansion in the first year of business activity.

With its policy of hiring the handicapped, the firm is long-needed proof that the average employer can hire handicapped persons, accept them as he does any other skilled worker in his plant.

At present PAMCO is making a shift from assembly to manufacturing. At least two PAMCO manufactured products are ready for the market with more on the way. Like many another manufacturer PAMCO was doing considerable defense work — about 75 pct of output. Recently it has been reducing the defense-to-civilian work ratio, has it under 50 pct—will continue to trim it.

PAMCO is switching from assembly work to manufacturing.

The average PAMCO employee (present operating minimum is 30, and is expected to rise as new products come into production) requires 2-3 weeks training. PAMCO employees are using

PARAPLEGICS MFG. CO. (PAMCO) did a $500,000 business last year.

lathes, performing milling operations, doing surface grinding, small press work, using high speed assembly equipment, test equipment, drill presses, automatic fastener machines.

The variety of operations at PAMCO is indicative of the skills available among the handicapped. The U. S. Employment Service indicates their lists of handicapped job applicants offer "just about any skill you can name."

There are a growing number of plants hiring handicapped persons, but unlike PAMCO, almost none have an organized program for placement of the handicapped. The few who do seem astounded by results. Said one employer, "They're pace-setters. They're so darn glad to be back at work, their output crowds the line."

Do Better Work

The employer had reason to be astounded. He'd hired, among others, a blind worker who began operating a drill press. With work falling off in that department, he was transferred to an inspection job using "no-go" gages, continued to turn in a bangup job. Another group of blind workers employed by an appliance manufacturer was finishing painted metal parts. Their unique sense of touch actually gave them an edge over other workers.

A stamping concern remains competitive though a high proportion of its work force does not see. An insurance firm numbers about 25 pct of its work force as handicapped. A farm equipment manufacturer has been quietly contacting the U. S. Employment Service with jobs for the handicapped for years. Far from a liability, the handicapped often prove willing to do more than their share on production line jobs.

As the experience of PAMCO suggests, there are a number of skills wasting in the idleness of the handicapped. Handicapped persons in plant jobs are operating spot welding equipment, shapers, grinders, milling machines, presses, sheers, stamping machines, doing assembly, inspection, operating gear hobbers, screw machines.

Nor does hiring the handicapped require great physical change in an existing plant. Foot operated machines can be troublesome, and most handicapped workers cannot work with heavy parts. But PAMCO moved into a screw machine plant, needed only to install slightly higher work benches to accommodate the arms of workers' wheel chairs, installed several low ramps in their one-story factory, and was literally in business.

Jets:

Ford unwraps six new engine test cells for J-57's.

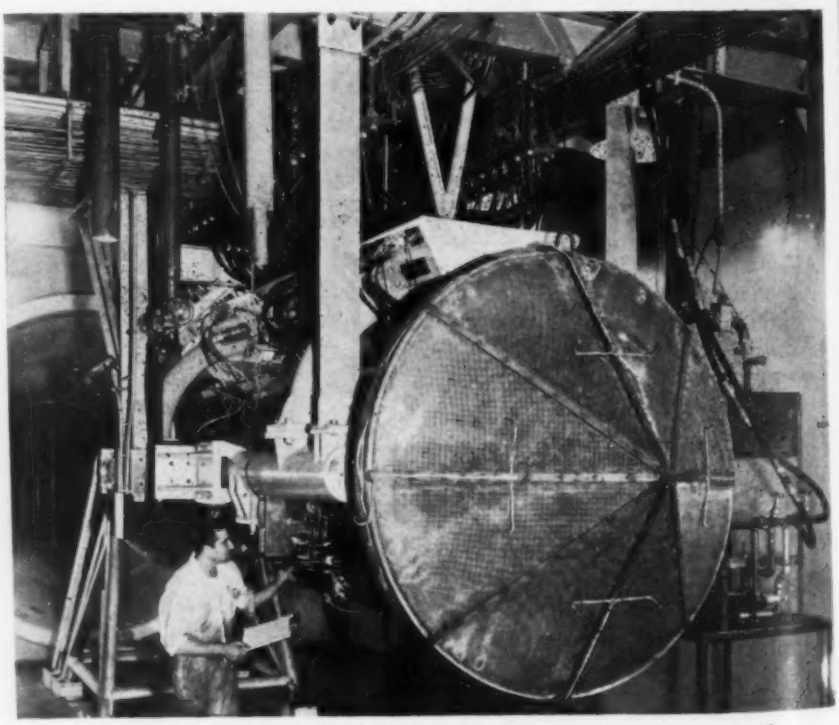
Ford Motor Co. and the Air Force last week pulled the wraps from Ford's six new jet engine test cells at Chicago.

The cells were completed in 9 months, 3 months ahead of schedule. Cost: $1 million less than the original $5 million estimate. Although some engines have already been produced, delivery to the Air Force of completed and tested engines is not scheduled until June.

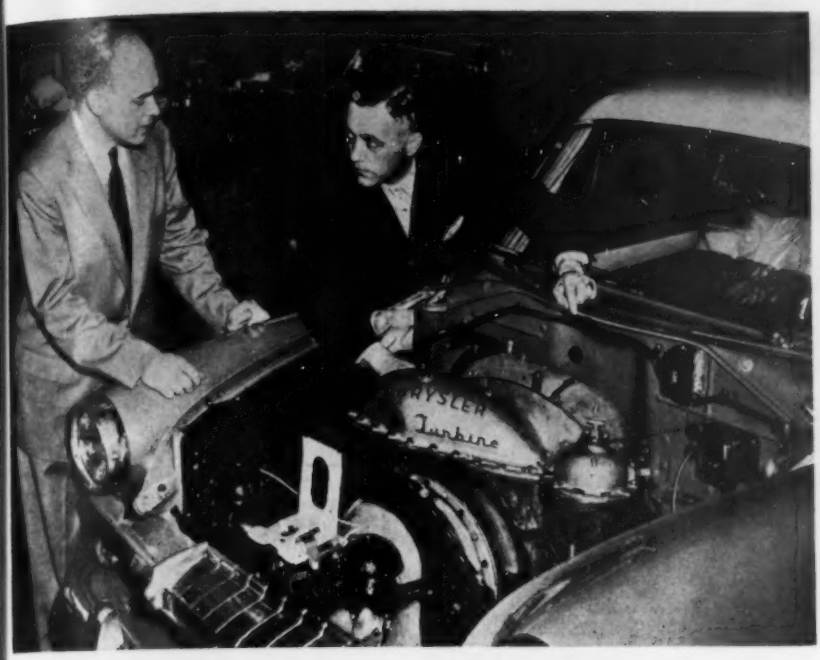
Employing a work force of 16,000 and some 12,700 machine tools, the plant is currently building a piston engine, the R-4360, which will go out of production this fall. Concentration on the J-57 means the Ford plant will (1) close down its in-plant magnesium foundry, (2) close its forge shop, (3) probably begin the casting and machining of titanium with some of this work subcontracted, (4) produce about 50 pct of the J-57 in-plant, as compared with 75 pct of the R-4360.

The new test cells will handle the J-57's 10,000 lb thrust and could handle an engine twice as big. Consisting basically of three sections, they allow the engine to gulp as much as 350,000 cu ft of air per min through a baffled roof, supply sufficient air to cool the jet exhaust from 1600-1800° F before passing through a 66 ft eductor tube and up through a 57 x 66 ft baffled exhaust stack.

Soundproofing is outstanding. The new cells will reduce the freewheeling howl of an afterburner-equipped turbojet to 1/100th its original level. Cell walls are 12 to 24 in. reinforced concrete.



WORKMAN makes final adjustments to J-57 engine prior to testing.



GAS TURBINE installed under hood of 1954 Plymouth coupe. Turbine weighs about 200 lb less than a piston engine of equal horsepower.

GAS TURBINES: On Tomorrow's Cars?

Chrysler's working prototype scooped competition . . . Fuel economy, production costs remain the imponderables . . . Detroit says: At least 5 years away—By W. G. *Patton*

While Chrysler's announcement that it has developed a gas turbine with all performance characteristics necessary for passenger car use has been discounted by some of its competitors, there seems to be agreement on these points:

(1) Chrysler's advanced stage of development on gas turbines has taken the industry almost completely by surprise. The Chrysler gas turbine development is undoubtedly one of the best-kept engineering secrets in Detroit.

(2) Chrysler's claim to fuel economy comparable with a similar sized piston engine is the point most frequently challenged. At the same time, it is freely admitted that recent progress in decreasing fuel consumption of gas turbines has been surprisingly encouraging.

(3) Other car producers have experimented with regenerators but no one but Chrysler has claimed ability to build a heat exchanger unit that fits into a very small space.

(4) Theoretically, Chrysler's competitors admit, there is nothing to prevent construction of a gas turbine with all the performance characteristics, including fuel economy, claimed by Chrysler.

No details have been released on the Chrysler regenerator or heat exchanger unit. There is currently speculation in Detroit that the device may be a type of rotating regenerator in which metal chips pick up the heat quickly and transfer it from the hot side to the incoming air. A device using this broad principle instead of the radiator principle has been used successfully in Europe, it is reported.

Starts Easy, Runs Cool

A number of significant details of gas turbine operation were disclosed last week in New York by George J. Huebner, Jr., who is in charge of gas turbine development at Chrysler. There is no starting problem. After a lapse of a few seconds, the gas turbine builds up quickly to its idling speed of 20,000 rpm. The turbine is designed to operate up to 50,000 rpm. Incidentally, GM's turbine installed in a highly experimental car, called the Firebird, idles at 8000 and has much lower top speed.

Speed control is readily accomplished through the foot accelerator. The exhaust temperature is actually cooler under most driving conditions than the exhaust gas of a piston engine. Air requirements are 4 to 10 times as much as for a piston engine but adequate volume of air is readily obtained under all driving conditions.

Performance is far ahead of a piston engine of comparable horsepower because of the high starting torque characteristics.

Maximum operating temperature of the turbine is 1600°F. Blades used are solid and not hollow. Conventional alloy materials for turbine blades may be used.

Economy A Must

It is known, of course, that both Ford and GM are hard at work on gas turbines. Little is known about Ford's program. GM has already announced both the eye-catching Firebird and a bus driven by a gas turbine. Several top GM engineers will present papers on gas turbines before the SAE at Atlantic City this June.

This fact deserves emphasis: Up to now, much of the work on gas turbines has been for the armed services. These designs have stressed light weight and top performance. Little else mattered. Present auto research stresses cost and economy. Weight is a secondary consideration. This new approach to the problem will undoubtedly result in many significant departures from earlier gas turbine design.

The impact of gas turbines on the machine tool industry can only be guessed at present. Three piston engine programs—Chevro-

let, Pontiac and Packard are already well advanced. However, many Detroiters will be much surprised if any new programs are started involving machining of large quantities of cast iron for piston-type engines.

Up to now highly alloyed materials for blades, alloy constructional steels, aluminum and magnesium have been used extensively in gas turbines. These specifications may change considerably but cast iron is not likely to have an important use in gas turbines.

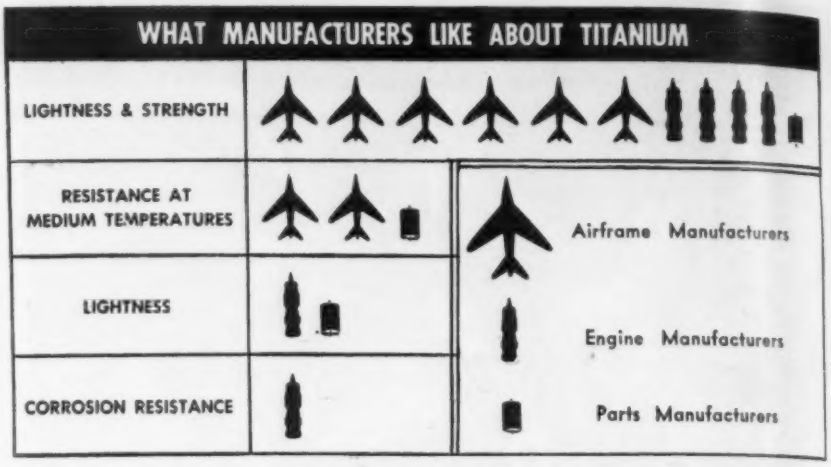
Gas turbines for passenger cars, trucks or buses are not just around the corner. Gas turbines are moving down the street, however, and as long as 10 years is considered to be the minimum life of a tooling program for a new passenger car engine, the announcement of successful gas turbine by Chrysler is indeed a significant event insofar as the metalworking industry is concerned.

Chrysler May Test Market

Most Detroiters think the gas turbine is at least 5 years away, although it is admitted that a competitive minded car producer who was willing to take the risk could undoubtedly jump out ahead of the pack with a gas turbine car, perhaps at an even earlier date.

What seems most likely to happen is that Chrysler or one of the independents will probably introduce a limited production car designed around a gas turbine power plant. If this car succeeds, the gas turbine will be extended to other lines of cars. Meanwhile, GM will keep pressing its bus program, learning where designs can be improved for trucks and passenger cars. When the economic situation is right, GM will probably turn to gas turbine.

There are, of course, still enthusiasts in Detroit for the piston engine, supercharged or improved in other ways. Competition will settle the issue in the final analysis. Right now gas turbines have the center of the stage. They will undoubtedly keep, and even improve, their present position, in the years immediately ahead.



How Aircraft People Like Titanium

Is titanium catching on in the aircraft industry? One firm in the titanium working field, Worcester Pressed Steel Co., wanted to find out. So the company surveyed 21 firms in the aircraft industry.

Result? At least 300 pct more titanium will be used in aviation during 1954 than 1952.

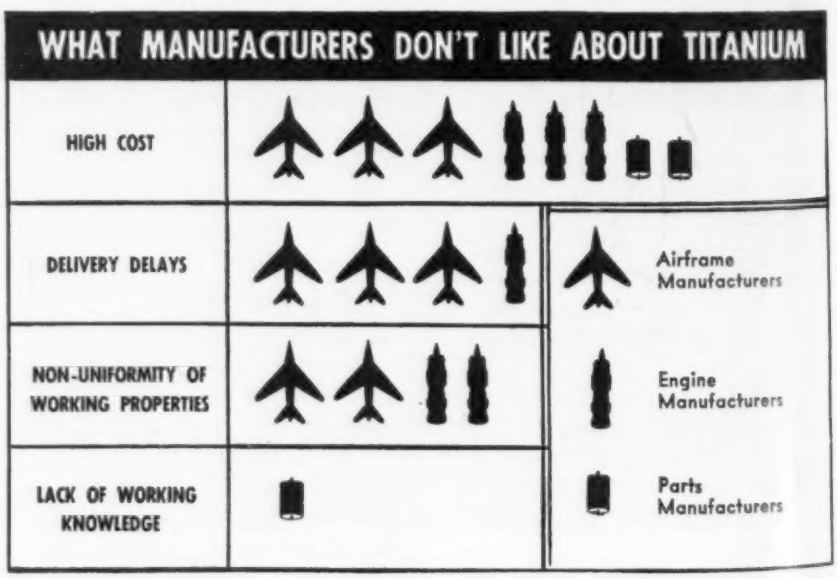
Nine airframe or airframe parts producers, six engine manufacturers and six components makers responded, giving reasons as well.

Consolidated Vultee Aircraft Corp. provided this impressive example: Use in 1952, mostly developmental, totaled 5000 lb; it soared to 55,700 lb in 1953; and plans call for 89,445 lb this year, 736,000 lb next year, and 2,302,000 lb in 1956.

But it's not all gravy. There was unanimous agreement that the next important step in titanium is higher quality at lower cost. Both mill products and sponge were recently reduced in price but the "new" metal is still an expensive one. Titanium's high strength-weight ratio, corrosion resistance, and good properties at medium temperatures still pay off in aircraft use, however.

Under technical problems, most serious is non-uniformity of working properties. Impurities and gage variations are also troublesome.

Airframe manufacturers seem to regard titanium merely as a replacement for stainless steel while engine and component manufacturers consider it in place of steel, aluminum and magnesium.



GAW: Test Case At Westinghouse

CIO's drive for guaranteed annual wage may hinge on outcome of talks with Westinghouse . . . Put GAW high on list . . . Plan would be costly to management—By *J. B. Delaney.*

Success of the CIO's drive for the guaranteed wage may hinge on outcome of contract negotiations between Westinghouse Electric Corp. and the International Union of Electrical Workers (CIO).

The IUE ranks the guaranteed wage No. 1 in a list of 11 demands presented to Westinghouse at the start of negotiations. A similar proposal is expected to be made to General Electric Co.

Similar to USW Plan

While Westinghouse has made no reply to the union proposal, it is expected to get a chilly reception. IUE's chances of getting anywhere with either Westinghouse or GE are considered slim. If the union has tossed in the proposal for anything more serious than as an issue to be traded off for something it really expects to get, a strike can result.

IUE's plan is patterned after the program devised by the United Steelworkers of America and presented last year to Alcoa, which rejected it. (THE IRON AGE, Feb. 18, 1954, p. 75.) The USW is expected to include a guaranteed wage in its demands on the steel industry this spring.

Tied to State Program

IUE's program would give Westinghouse employees the ultimate in job security. Virtually every worker would be eligible. Benefits would range from 4 weeks' pay for employees with 3 months' service to at least 48 weeks for those with the company a year or more.

The plan would be tied in with state unemployment compensation payments, with the company making up the difference between the state benefits and the total weekly payments due a laid-off worker. State unemployment compensation funds are financed by a payroll tax on employers.

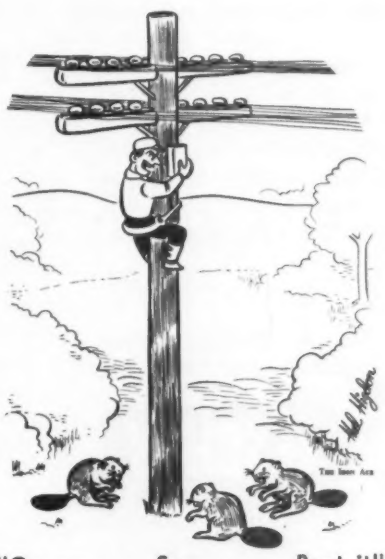
No Payments First Year

IUE's version of the guaranteed wage would be financed by a 5 pct payroll tax to be paid by the company. Westinghouse's total payroll last year, including salaried workers, was approximately $600 million, 5 pct of which would be $30 million.

No payments would be made from the fund until it had accumulated for 52 weeks and then only for layoffs which would occur after this build-up period. Workers would be disqualified if they refused "suitable" employment elsewhere during the period of layoff from Westinghouse.

Main features of the IUE proposal:

(1) Guarantees would range up to 2080 hr and not less than 48 weeks at 40 hr each. Rate of compensation would be based on employees regular day work or guaranteed incentive rate of pay per hr including the shift differential. Proportionate guarantees would be made for salary workers.



"Go on . . . Scram . . . Beat it!"

(2) Furloughed workers would report immediately to U. S. Employment Service to apply for work and to the Unemployment Compensation Board for unemployment compensation payments. If "suitable" work is offered by an outside company the worker would be responsible for accepting it.

(3) Guarantees would be reduced by extent of unemployment compensation payments and payments for other employment.

(4) Eligible employees laid off for 52 weeks or more and then rehired would have a renewed guarantee for the ensuing period.

(5) Payments would be financed from a fund equal to 5 pct of the payroll. No payments would be made until the fund had accumulated for 52 weeks and only for layoffs thereafter.

For more insight into how the CIO plans its guaranteed annual wage strategy turn to the next page. At the United Auto Workers Sixth Annual Educational Conference delegates discussed a new plan which would raise the ante above previous proposals—Ed.

(6) Fund would be split into a trust fund administered by a joint company-union board with a neutral chairman, and a contingency fund which would be exhausted before anything is withdrawn from the trust fund.

(7) When total fund available would become equal to 10 weeks pay for each employee the contributions would be reduced so as to maintain the fund at that level.

(8) Severance pay of one week for each year of service for workers permanently separated due to abandonment by the company of a plant.

Other IUE demands include a "substantial" wage increase, a minimum wage of $1.25 per hr, equal pay for women on comparable jobs, a profit-sharing plan for production workers, and improvements in pension, health, insurance, vacation, and incentive programs.

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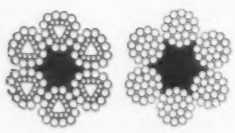

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—Labor—

GAW Strategy:

Autoworkers educate members on raising the ante.

As the 1955 expiration date of contracts between the UAW and auto industry draws near, trial balloons on the controversial guaranteed annual wage are launched at every meeting of UAW officials.

The latest, which changed the formula from a calendar year basis to any 52-week period, came from Chicago last week at the UAW's Sixth Annual Educational Conference.

The big difference in the Chicago plan is that a laid off worker would be guaranteed a full week's salary for 52 weeks from the time he is laid off. As the official wording puts it:

"A fully-eligible worker can always look forward to 52 weeks security if he gets laid off. This distinguishes the UAW plan from those plans in which the guarantee is on a calendar year or fixed 12-month basis."

Pick Up Difference

But the number of weeks a worker would be guaranteed full pay would be determined by seniority on a formula worked out at the bargaining table. A probationary employee with less than 90 days employment would not be eligible.

The payment of this full week's pay would be integrated with the state unemployment compensation program with the employer to pick up the difference between the worker's compensation check and his regular weekly salary.

No statement was immediately issued by any of the major auto companies. However, a look back to remarks made in January by Harlow H. Curtice, General Motors president, on the guaranteed annual wage gives an indication of GM's position on increasing industry's contribution to state programs.

He pointed out that employers have paid more than $18 billion into state unemployment compensation funds and that GM alone had contributed more than $240 million.

Bankers see recession end . . .

Bankers in the Cleveland area have partially disqualified inventory adjustments in analyzing the current business recession. At a recent meeting of Security Analysts in the Ohio city a panel of banking executives unanimously concluded that inventory liquidation was only part of the problem.

The banking panel agreed the slower tempo in business was basically the result of a gradual swing from an inflated to a balanced economy. Readjustment pangs, they believed would probably be felt until a traditional recession cycle of 12 to 14 months has elapsed. This would mean an end of the business dip by late summer, early fall.

Although bankers could see no definite growth trend developing immediately, verbal crossfire at the panel session did highlight many of the stabilizing factors.

Mentioned most frequently as major props for optimism were: (1) Trend in business failures declined during first quarter, (2) construction was up 2 pct over first quarter last year and record pace was set during the first 22 days in March, (3) building contracts are up 13 pct during first quarter compared to the same period last year, (4) inventories and consumer debt are down, (5) world and domestic commodity prices have remained fairly stable and (6) bullish stock market averages continue to point the way to an expanded economy.

If the Administration isn't stampeded into inflationary deficit financing by unemployment and if retail prices come down on a par with reduced consumer income, bankers feel there is hardly any factor left to seriously disturb our economy. Panelists who took this position emphasized there had been no wild speculation which might serve as a prelude to another 1929.

. . so do manufacturers . . .

There will be a business upturn by midyear. That's the view of 34 of 55 manufacturing executives surveyed by National Industrial Conference Board. For some the business turning point has already taken place, though a few were uncertain about the permanence of any business rise.

Although new orders were reported still lagging production, the majority of companies surveyed reported an encouraging increase in orders during February. Sixty-two pct expect more orders in the second quarter than they received in the first, 26 pct see no change, and 12 pct predict a loss of orders.

Four out of 10 companies expect second quarter production will top first quarter output, while less than two in 10 predict a decline.

On the troublesome inventory question the manufacturers' replies were also encouraging. Number of firms reporting a decrease in raw materials and goods in process inventories during February was three times as many as those indicating an increase.

Fifty-five pct of 118 reporting companies said they plan to further reduce total inventories in the next 3 months, 23 pct expect increases, 30 pct will hold the line at first quarter levels.

Only 19 of 119 companies are cutting capital expenditures because of poor business conditions though more will do so if the business decline continues much longer or becomes more severe.

Sixty pct of the firms surveyed said their business had been hurt by the recession. Metalworking industries are the hardest hit, particularly automakers, equipment manufacturers, producers of general industrial machinery, nonferrous metals, and steel and foundry operators.

and Borg-Warner goes along . . .

The head of one of the nation's most diversified companies isn't pessimistic about the business outlook for 1954 and said his firm is investing $20 million in expansion this year. R. C. Ingersoll, president of Borg-Warner, told THE IRON AGE he expected seasonal improvement in automotive and farm equipment demand to take the edge off first quarter setbacks.

Mr. Ingersoll expected auto production for the year to be off from 15 to 18 pct and Borg-Warner defense orders to drop as much as 20 pct. However, he also saw signs that there might be a revival.

Mr. Ingersoll told THE IRON AGE he felt most hopeful about second quarter outlook for farm equipment sales following a recent talk with the president of one of the largest farm implement firms in the nation. While midwestern dealers are still liquidating showroom stocks, increased demand promises to make second quarter better than the past 3 months.

Autos Are Stabilizers

Mr. Ingersoll told Cleveland Security Analysts Borg-Warner would rely on diversification to obtain a satisfactory margin of profit. The company, which has spent an estimated $100 million in new plant and equipment since World War II, plans to invest approximately $20 million for expansion this year.

Only pessimistic note sounded by the Chicago executive was tied in with comments on the progressive decline of the independent automakers. But he did go on to indicate automotive production would "continue to be the greatest stabilizer of our economy."

AERIAL VIEW of Reserve Mining Co.'s primary crushing plant at Babbitt, Minn. Workers' homes at far right.

TACONITE: Firms "Really Rolling"

Half billion dollars committed in past year . . . Plant beneficiation capacity of 9.25 million tons in 3 to 4 years . . . Cost still marginal . . . New towns going up—By R. M. Lorz.

For over 30 years miners, technicians and steel men have talked about extracting the riches in the flint hard, gray-green rock called taconite. "Now," in the words of one mining official, "we're really rolling."

Within the past year total investment committed for taconite beneficiation by three large mining firms has moved past the $500-million-mark. Remarkable things have already been done in sub-zero Minnesota weather. Near Aurora and Beaver Bay modern pioneers have leveled virgin forests and cleared away millions of yards of solid granite. Harbors have been dredged and breakwaters built. Whole townsites have been cleared away and are now in the construction stage.

What Erie's Doing

As soon as the spring break-up is complete Erie Mining, Reserve Mining and U. S. Steel's Oliver Mining will get into high gear. In summary here's what has been done and what is expected:

Government approval of a $300-million fast tax writeoff has turned on the green light for Erie Mining to start active work on a full scale beneficiating plant 8 miles east of Aurora. Townsite has been cleared near Partridge Lake and construction on the 73-mile railroad connecting plant with loading docks at Two Islands will be started up this spring.

Work on "Taconite Harbor" near Two Islands is moving ahead. By next fall three new communities in the Aurora-Mesaba and Schroeder areas should be beyond the general store, warehouse stage. Experimental operations at Aurora have been underway since 1948. Annual capacity of 200,000 tons will be maintained at this plant.

While no definite schedule has been announced on completion of the full scale beneficiating plant, capacity of at least 5 million annual tons of pellets is expected within 3 or 4 years. Erie officials think plant capacity will almost immediately be set to produce at least 7.5 million tons of pellets. Eventual capacity within the next 10 years is scheduled to reach 10 million tons.

Taconite currently mined near the experimental plant at Aurora averages from 63 pct to 65 pct iron after upgrading. Project is being underwritten by Bethlehem Steel Corp., Youngstown Sheet & Tube Co., Interlake Iron Corp. and Steel Company of Canada.

Build New Town

Republic and Armco Steel's projects at Babbitt and Beaver Bay have been progressing steadily for the past 2 years. An estimated $160 million investment should start paying off for Reserve Mining in mid-1955 when annual capacity is programmed to reach at least 2.5 million tons. By 1957 Reserve officials expect annual capacity to hit a minimum of 3 million tons (capacity should actually approximate 3,750,000 tons).

In addition to the beneficiating plant, a new town with an estimated 5000 inhabitants will be located near Beaver Bay. Reserve has built 64 homes and paved streets and sidewalks in developed areas in preparation for the day when the locale will be known as Silver Bay.

Plan 10.5-Million-Ton Capacity

At Babbitt, where a small scale commercial plant reached capacity of 300,000 tons last year, Reserve has constructed 129 homes. An additional 300 homes and an 18-room school and community cen-

DRILL BOAT at Reserve Mining Co.'s E. W. Davis works on Lake Superior starts work on development of harbor facilities.

ter are nearing completion. When the company's construction program reaches its peak 3000 men and $6 million worth of equipment will be on the job.

Eventual capacity of 10.5 million tons of pellets is anticipated in this area. Total investment of at least $300 million will be needed to realize this goal.

U. S. Steel's Pilotac and Extaca developments at Mountain Iron and Virginia represent an estimated $23-million investment in the future of taconite.

Oliver Goes Slowly

Ore is crushed in four stages at the Pilotac plant about 1 mile from the Oliver Mine. Sintering and nodulizing of the fine ore powder takes place about 6 miles from Mountain Iron at the firm's Extaca plant. While operations at these two pilot plants have been underway for only 2 years, full scale equipment has been used from the start to provide a firm basis for future expansion.

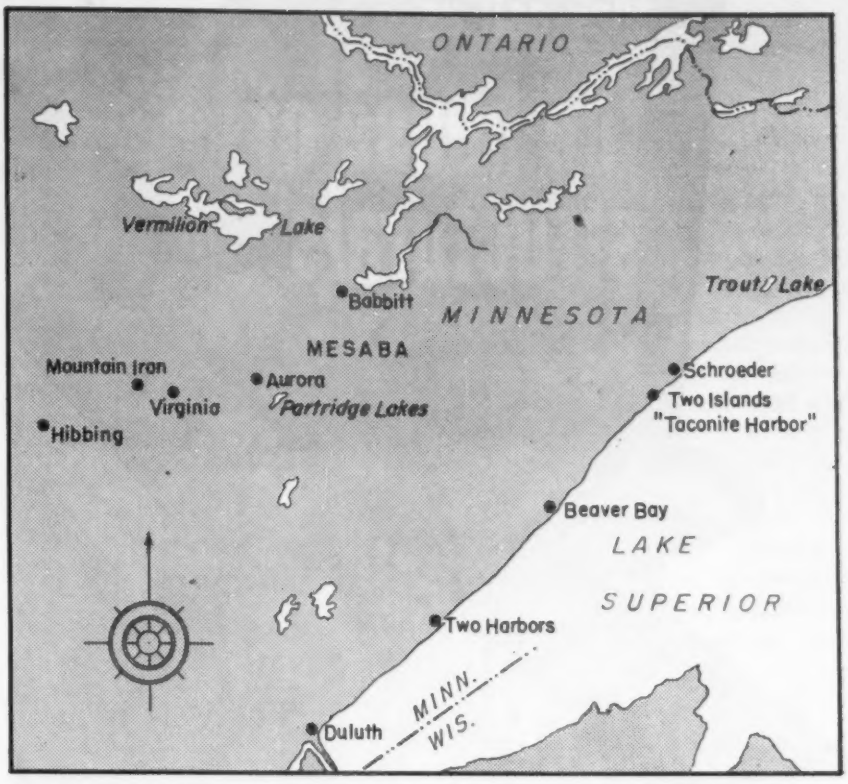
At the moment the corporation has no plans to expand the plant's annual 500,000-ton capacity. There are very good reasons why Oliver is moving more slowly than other firms. First, U. S. Steel is in a good position as far as natural and foreign ore reserves are concerned. Second, the firm seems to be waiting out developments to get a closer view of demands.

Foreign Ores Compete

So in the foreseeable future the Oliver development will probably remain near the 500,000-ton level.

Viewed from any angle the current taconite boom will do great things for the Minnesota area as far as employment is concerned. Construction either planned or undertaken should provide employment for more than 7000 workers while facilities now operating or under construction will require more than 5000 new employees. A new population of at least 35,000 will come with these employees.

Discussion of taconite prospects unearths strenuous competition from both Canadian and foreign ores. Anticipation of a 70-million-ton shipping season on the Great Lakes this year has given some observers the impression that interest in low-grade ore will quietly wither.



TACONITE MINES and processing plants are located in Minnesota iron areas where huge development is underway.

Steel firms and mining companies think pessimists are very short sighted. Millions of dollars have been committed, they say, and this money will be spent. Realization of capacity goals will of course be dependent on business conditions generally. But if economists are right in predicting tremendous industrial expansion most mining experts think a projected annual capacity of 40 million tons of beneficiated ore is sound.

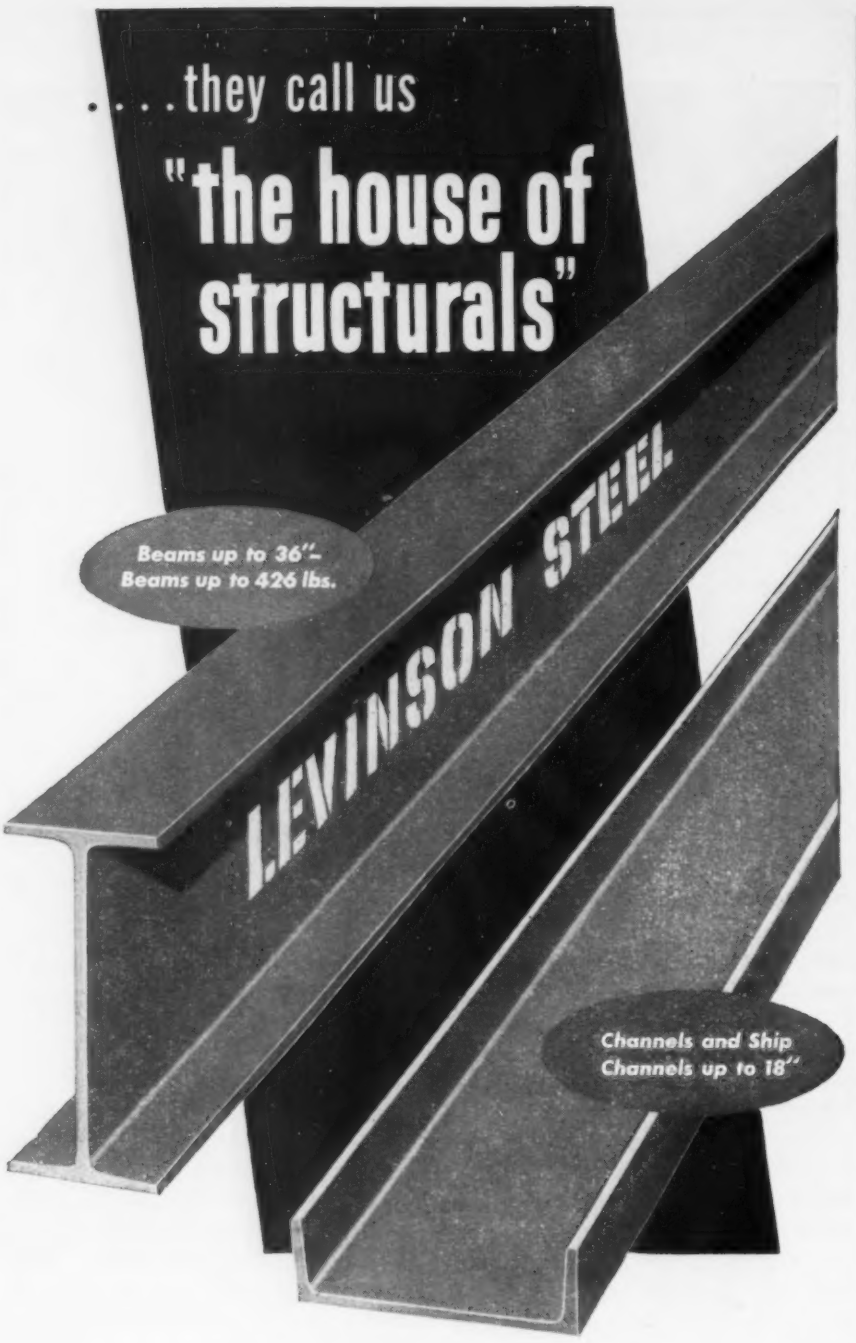
Pricewise taconite will remain marginal for a long time. There can be no arguing with the fact that in the initial stages it costs about three times as much to process low grade ore as it does to handle open pit ore.

Counterbalancing the three to one ratio will require a united community and industrial effort. If technology advances and taxes and labor costs are kept within reasonable bounds taconite definitely can be competitive.

Offers Many Advantages

There are a number of reasons why Great Lakes interests should get behind the taconite program, according to steel men. Continuance of the region's outstanding business position is first. Other factors might include lower power and fuel rates resulting from introduction of tremendous blocks of power; increased personal income flowing from new manufacturing firms; and prospect of a more stable economy stemming from taconite's 12-month operating cycle.

Taconite developers realize they face a lot of question marks. One mining executive told THE IRON AGE he felt gambling on low grade ore was in many respects like betting on a horse race. If the analogy holds water, taconite should pay off. Some of the shrewdest business heads in this country have been studying the ore form sheet for years.



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—Expansion—

Titanium:

New contracts to add 18,800 tons to annual output.

New titanium production contracts will be signed within the next month which are expected to increase planned productive capacity within 5500 tons of present defense goal of 37,500 tons annually.

Contracts which are now at the signature stage are with E. I. du Pont de Nemours & Co., 7000 tons; Electro Metallurgical Co., 10,000 tons; and Dow Chemical Co., 1800 tons.

Supply Will Tighten

This 18,800-ton total will be added to presently planned production by Du Pont, Titanium Metals Corp., and Cramet, Inc., which would then add up to a potential programmed capacity of about 32,000 tons (THE IRON AGE, Apr. 8, p. M-22).

Although production is currently slightly ahead of consumption, there is no realistic surplus. Any excess production is to be set aside as a reserve defense inventory.

Recently, the chairman of the government's titanium industry advisory committee told a Senate subcommittee that 1954 production is likely to be slightly in excess of 5000 tons. It is expected too, that the reserve inventory at the end of the year may be 3000 tons.

Contracts and preliminary proposals for additional titanium capacity or fabricating facilities are currently being discussed.

Need More H-Bomb Material

U. S. production of fissionable materials and of thermonuclear devices is to rise "enormously" during the next several years.

Chairman Lewis Strauss of the Atomic Energy Commission made this frank disclosure last week, and also confirmed that the U. S. is stockpiling H-bombs. Production of H-bombs of all types has been stepped up on orders of President Eisenhower, he said.

Increased production of the bombs creates an urgent need for additional capacity to produce "special materials" for thermonuclear weapons, Chairman Strauss says.

Coast Shops Tackle Auto Parts Orders

West's assembly plants cut costs by local buying . . . Area vendors push for high volume orders . . . Freight savings help trim prices . . . Meet quality requirements—*By T. M. Rohan.*

Western metalworking shops bird-dogging for business were finally beginning to flush out the automobile business in earnest last week. And the door was wide open, as automakers step up their drive to cut costs by developing western suppliers.

"All of a sudden the vendors have come to life. Now they're really looking for business and we're eager to help them," Bert Church, purchasing agent for Plymouth-Dodge at San Leandro, Calif., told THE IRON AGE last week. "Until now they have had all they can handle without trying auto parts, but now they can use the business."

Cost Savings Good

This plant is now buying over 300 production items in the West. By July 1 this should increase by 60 pct and, by the end of the year, 100 pct. Over 800 items are now under negotiation for manufacture by western plants. West Coast producers will supply a major share of the plant's needs for the first time in many cases, especially nuts, bolts and screws.

List of possibilities now runs over 2500. On a volume of about $250,000 parts being bought in the West, Plymouth-Dodge saves $70,000, compared to cost from midwestern and eastern suppliers.

Freight Umbrella Helps

This of course is money in the bank for an automobile manufacturer. Detroit is taking sudden notice of the fact that western shops can get out the production and meet prices. Western plants have done so well in many cases that Midwest and eastern auto suppliers are now looking for Coast subcontractors.

"Western plants still have a lot to learn about the automobile business," Mr. Church added. "One firm here has worked 4 years to get an order. Once they proved they could handle it, things really began to roll. They're shipping parts to auto plants as far away as Texas; we now have a dependable local source of supply and are getting parts for equal cost or lower."

One major umbrella for western plants, of course, is high freight rates. Another is elimination of inter-plant handling charges and red tape. Prospective suppliers are given drawings and technical help, then asked to bid. If they can fulfill all quality, financial and other considerations and equal or beat the price from the East and Midwest they get the order.

MOUNTING wheel on western-assembled Ford Ranch Wagon.

Wheels, springs, bumpers and attachments manufacturers in Los Angeles have long thrived on this market. Leaders are Norris-Thermador and U. S. Spring & Bumper. The latter is slated to be bought by Rheem Mfg. Co.

Newest western vendor last week was Bethlehem-Pacific, which has set up a pilot operation in its Los Angeles plant for production of battery hold-down studs, three types of spring clips and jack handle lugs. While small as parts go, volume is expected to be considerable for Plymouths at San Leandro and Los Angeles assembly plants. Bethlehem will also supply tie-rod forgings, U-bolt seat supports and other parts to other manufacturers.

"Our Detroit supply on the five items has already been cut off and approval for production is only a formality," Mr. Church said. "Actual parts are in the sampling stage and comparisons being made with parts currently being supplied."

Western purchases by this one plant alone total about $12 million annually, of which a heavy percentage is in non-metal items, such as seats, tires, plastics, glass, etc.

Stress Local Buying

In items like radiators, local buying is also proving a windfall to western plants. R. J. Reardon, general manager of Modine Mfg. Co.'s Whittier, Calif., plant, told THE IRON AGE last week:

"When this plant opened in March, 1950, it was turning out 300 radiators daily for Ford and Mercury. Production today is geared to 3000 daily, and Studebaker, Plymouth and Willys have been added. This increase indicates just how permanent the 'buy locally' trend is. We feel a stronger auto industry will be turning out more and more autos in Los Angeles. That means a promising future for the automotive parts industry."

Charles Wahls, Ford Motors purchasing agent in Los Angeles, said, "We are now buying 700 metal, rubber and plastics parts from California manufacturers for about $100 million per year. We are seeking to increase this percentage all the time by encouraging local manufacturing."

A large portion will go to the $50-million Ford assembly plant now being built at Milpitas, Calif. The largest western automaker, General Motors, with 44 pct of area output at 299,000 last year spent $110 million for services and sup-

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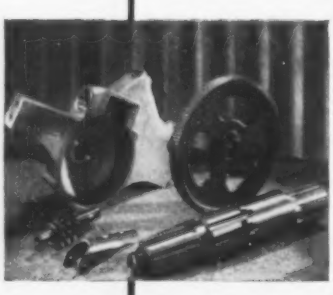

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ply (THE IRON AGE, Jan. 28, 1954, p. 81).

Mr. Wahls admitted that a big expense headache now is the freight charges on shipping such major parts as engines, rear axles and frames and bodies from eastern plants to the West Coast.

"At present," he said, "there are no heavy presses available on the West Coast to turn out such products. But I visualize Los Angeles as becoming the world's largest manufacturing center in the next 10 years, and I'm certain heavy industry will come into this growing market."

Mr. Wahls pointed out that 4 years ago, Donald Douglas, president of Douglas Aircraft, formed a subsidiary, Western Pressed Metals, to utilize the large presses in aircraft plants for such outside contract work as automotive bodies and parts. Today the firm is still alive and will doubtlessly be reactivated if a lull should develop in aircraft contracts.

Stronger Than Steel

"Ford does not have any timetable set up for switching to total car construction on the West Coast," Mr. Wahls said. "Such a move is dependent on several factors—the availability of heavy industry to do the job, the continued growth of auto production on the West Coast and the use of new materials in auto designing."

"The fabrication of plastics is so far advanced that the possibility of all-plastic bodies within the next decade is more than idle talk. Ford is conducting several experiments with fiberglass body construction and is getting surprising results. The plastic body is proving to be stronger and safer than steel. A few weeks ago at the Ford plant, four men jumped up and down on a plastic top without so much as denting it—something that would have bashed in a steel topped car."

Mr. Wahls predicts that, "with Southern California leading the nation in plastics industry development, the area will quite likely become the world's automotive center if a widespread swing to plastics is made in the automotive industry."

FOREIGN TRADE: Ike Seeks Streamlining

Prods reluctant Congress to slash red tape . . . Asks more flexible tariffs, easier overseas investment . . . What's likely; renewal of present laws—By *R. M. Stroupe.*

Congress now has the chance to decide whether the economic understanding of the free countries is to be preserved, or whether Russia will be allowed to split these nations along trade lines.

This opportunity for decision is presented to the legislators by President Eisenhower in his request for a 3-year extension of the Trade Agreements Act and for related actions.

In the main, the President's proposals follow recommendations offered earlier this year by the Commission on Foreign Economic Policy, headed by Clarence B. Randall, Inland Steel chairman (THE IRON AGE, Jan. 28, p. 79). The White House trade message was worked out unhurriedly after Cabinet officers and others were asked to comment.

Approval Unlikely

Legislative bills calling for enactment of various portions of the Administration's export-import program will follow, but the outlook for much congressional agreement on these measures this year is dim. Many lawmakers, fearful of antagonizing high-tariff elements back home, would like to ignore the bills as long as possible.

Likeliest result of the heel-dragging is the approval, late in this session, of a simple, 1-year extension of the present trade law.

Apparently realizing his proposals would not get full backing in Congress, the President calls attention to the continued existence of "a patchwork of temporary expedients and a host of restrictions" which impede world commerce. Removal of those barriers under U. S. jurisdiction, he said, would expedite two-way trade and benefit this country and its allies.

Suggested in the Eisenhower message, though not stated specifically, is the growing threat of Russian aggression in the economic sphere. Soviet efforts to lure European and Asiatic countries into close commercial ties with the Red bloc are becoming more strenuous.

Promises of mutual gain through reciprocal trade agreements with Russia and its satellites have not been entirely lost on Western Europe. Reportedly, businessmen there are putting much pressure on their governments to permit a greater range of exports to the Reds, in exchange for materials in excess of Soviet needs.

Blueprint For Leadership

Because the Russian threat could open the way to a dangerous realignment of economic groupings, the President's program can be viewed as a blueprint for U. S. use in seizing the initiative in the field of trade. To meet some of the problems faced by this and other countries, he wants the following from Congress:

1. Continuation of the Trade Agreements Act for three years, with amendments to allow him to make selective cuts in tariff rates on certain unnamed imports. Contemplated reductions would be gradual and would be so handled as to prevent jolts to the U. S. economy, Mr. Eisenhower says.

2. Approval of legislation, forthcoming from the White House, to simplify commodity definitions and set up smoother procedures for collecting customs duties.

3. Passage of the over-all tax reform bill, which in part would allow U. S. companies a freer hand in investing money abroad. The President urges that Congress provide for guarantees against loss of new overseas investments in the event of war or native uprisings.

4. Amendment of the Buy American Act to exempt from its terms those bidders from foreign countries which allow American bidders equal treatment with their own citizens.

Subsidize Raw Materials

5. Endorsement of the Randall Commission recommendation that the U. S. work with other countries to raise production of raw materials and stabilize world prices, especially of metals and minerals. "Direct means"—a term which could be translated as "subsidies"—may be the sound way of stimulating U. S. output.

6. Consideration, perhaps next year, of an Administration program for strengthening the merchant marine.

7. Termination of direct economic aid as a general policy, with a continuing use of technical assistance to some countries.

8. Promotion of more non-strategic trade between East and West, with the stipulation that U. S. security is to be protected fully.

Fabricated Structural Steel

Contracts, Shipments, Backlog

	Estimated Net Tons		
	1954	1953	Avg. 1947-50
CONTRACTS CLOSED			
February	267,310	180,882	152,186
SHIPMENTS			
February	251,981	251,137	161,170
BACKLOG	1,697,313	2,128,389	1,212,333

Source: American Institute of Steel Construction

Air Raid:

Seek $110.3 million for control, warning systems.

Congressional approval of Air Force plans to spend $110.3 million for aircraft control and warning systems as part of the U. S. defense structure is requested by the Defense Dept.

This request is part of an $897 million public works authorization bill submitted to Congress last week by the Pentagon. The money would be used for additional Army, Navy, Air Force, and Marine Corps construction and for Alaska Communications System installations.

Besides the new authorization, the bill includes reprogramming of previously-approved Air Force construction amounting to more than $309 million.

Spend Most in U. S.

New projects named in the bill include proposed construction in 43 states, the District of Columbia, Alaska, Hawaii, the Marshall Islands, the Philippines, Japan, Iceland, Cuba, and Okinawa. Some facilities considered classified would be built at unnamed locations.

Nearly half of the $897 million requested would be spent by the Air Force, which asks authority to build facilities to accommodate 137 wings. USAF planners would spend $312.3 million in the continental U. S., $9.8 million outside, and $110.3 million for warning systems.

The Army is calling for about $150 million for use in the continental U. S., $19.2 million outside, and $87.7 million for classified projects. The Navy would spend $113 million in this country, $30.7 million outside, and $63.3 million for classified construction.

Air Force to Trim Buying

Official estimate of Air Force procurement activity is that in the next 2 years there will be a marked decline from the present peak rate affecting both large and small defense contractors.

Small business recently received warning of the future down-trend in buying from Max Golden, deputy for procurement and production to Assistant Air Force Secretary Roger Lewis.

The Air Force, Mr. Golden told a congressional small business group, feels it has been successful in its efforts to give a fair portion of orders to little companies. It is intended, he said, that small firms continue to get a just share, but "it will be a share in something approximating half its present volume."

Standardize Dozer Attachments

Tests in progress at the Engineer Proving Ground, Ft. Belvoir, Va., will show whether interchangeable attachments for commercial-type bulldozers used by military units will produce desired savings in time and money.

Members of the Society of Automotive Engineers, several tractor and attachment manufacturers, and the Army Engineers have turned out a number of devices which have passed interchangeability tests and are being studied to determine operational effectiveness.

These attachments are being used on Allis-Chalmers, Caterpillar, and International tractors modified to provide SAE standard rear power take-off and mounting facilities. Attachments also have been modified to fit the tractors so that dozers are interchangeable between hydraulic and cable controls.

Contracts Reported Last Week

Including description, quantity dollar values, contractor and address. Italics indicate small business representatives.

Material for J46 WE8A and 8B engines 383/2117-4/51, Var, $896,989, Westinghouse Electric Corp., Philadelphia, Penna., *W. C. Wilson.*

Seat assy and track to support seat assy, Var, $65,199, The Aerotherm Corp. c/o Thermix Corp., Greenwich, Conn.

Engine parts for various aircraft, Var, $963,315, Bendix Products Div., South Bend, Ind., *G. I. Lyman.*

Maintenance part and reel used on automatic hose assy, Var, $195,275, Flight Refueling, Inc., Baltimore, Md.

Container, metal, M266, complete with tube, chipboard tubing, for shell, illum, M301A1, for 81 MM mortars, 375,000 ea, $183,150, Standard Container, Inc., Montclair, N. J.

Air turbine starter, BuAer model A-20, 157, $341,475, United Aircraft Corp, Hamilton, Standard Div., Windsor Locks, Conn.

Electron tube type 3C24 P.D. 59/54SA-14012, 6680 ea, $56,914, Eitel McCullaugh, Inc., San Bruno, Calif.

Electron tube type 4X150G IFB-SC—36-039-54-891-59, 2178 ea, $86, 619, Eitel McCullaugh, Inc., San Bruno, Calif.

Electron tube type #2C40 P.D. 59/54-SA-10066(4), 3500 ea, $55,265, General Electric Co., Schenectady, N. Y.

Crystal units CR-5/U IFB-SC-36—039—54-49-55, 54033 ea, $79,704, Midland Mfg. Co., Inc., Kansas City, Kansas.

Blanket assy engine exhaust, Var, types & quantities, $54,542, John J. Foster Co., Santa Ana, Calif.

Submarine periscope deplumers, 38, $583,427, Edo Corp., College Point, N. Y.

Ship binoculars, 45, $79,875, Kollmorgan Optical Corp., Northampton, Mass.

Aluminum crescent type davits, 19, $66,-232, Gifford-Wood Co., Hudson, New York.

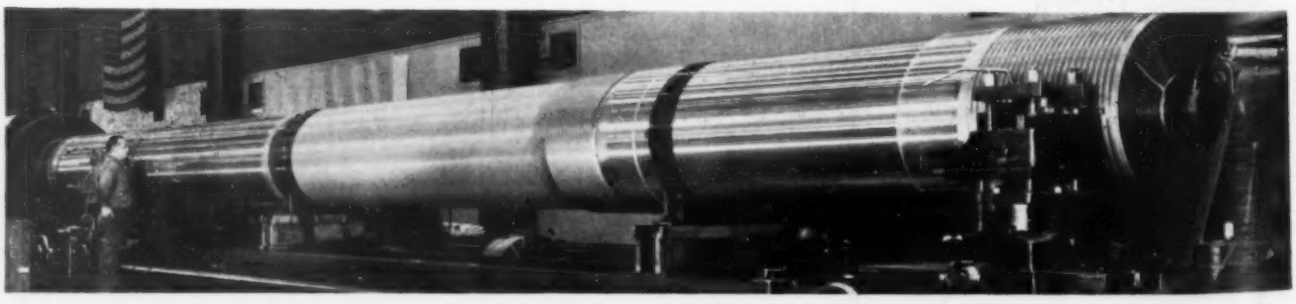
Blading sets, 104, $84,516, Westinghouse Electric Corp., Washington, D. C.

Air compressor, 39, $126,666, Worthington Corp., Washington, D. C.

Turbine driven forced draft blower, 27, $997,000, Hardie-Tynes Mfg. Co., Birmingham, Ala.

Pumps, 56, $610,524, Delaval Steam Turbine Co., Trenton, N. J.

Centrifugal fans, 460, $189,585, Buffalo Forge Co., Washington, D. C.



THIS 181,000-LB forged steel column is one of eight for a 35,000-ton forging press United Engineering & Foundry Co. is building for the U. S. Air Force. Column measures 60 ft, 10 in. long, is 36 in. in diam, and has an 8.5 in. hole bored lengthwise through its center.

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Industrial Briefs

Established . . . BLISS & LAUGHLIN, INC., has established a new Department of Commercial Research. Harry M. Clarke is manager of the department with headquarters in Harvey, Ill., the company's general offices.

New Addition . . . THE PERMUTIT CO. opened a new metalworking plant in Lancaster, Pa. earlier this month.

Acquired . . . ARMCO STEEL CORP. has completed negotiations for the acquisition of all the common stock of Southwest Steel Products as of Mar. 31, 1954.

Grand Opening . . . WAUNAKEE ALLOY CASTING CORP. formally opened a new foundry in Waunakee, Wis. last week.

Going Up . . . CLARK EQUIPMENT CO., started steel erection for its new manufacturing plant on a 100-acre tract of land on the outskirts of Benton Harbor, Mich. Plant is expected to be in operation by the end of 1954.

Newly Formed . . . ELECTRODATA CORP., Pasadena, Calif., a new wholly owned Consolidated Engineering Corp. subsidiary was formed recently. James R. Bradburn was named executive vice-president and Robert F. Feland, Jr., sales manager.

Special Study . . . AMERICAN MACHINE & FOUNDRY CO.'s proposal to the Atomic Energy Commission for a study related to industrial nuclear power plants has been approved by the AEC.

Plays Host . . . FIRTH STERLING INC., Pittsburgh, was host to aluminum industry representatives at a forum on tool engineering problems.

Exclusive Basis . . . FANSTEEL METALLURGICAL CORP. and Leach Relay Co. have concluded an agreement by which Leach Relay Co. will act as the exclusive distributor of Fansteel selenium rectifiers in 11 western states.

Distributor . . . PARKER APPLIANCE CO., Cleveland, has named Williams & Co., Louisville, Ky., as a distributor.

Moving Soon . . . SURFACE COMBUSTION CORP., Toledo, will move its Chicago Industrial Furnace Div. office to Park Ridge Federal Bank Bldg., 116 S. Prospect in Park Ridge, Ill. later this month.

Gets Trophy . . . GARRETT CORP., Los Angeles, has been awarded the Silver Anvil Trophy for outstanding achievement in industrial relations in 1952-53 by the American Public Relations Assn.

Added Feature . . . AMERICAN ZINC INSTITUTE has an added feature on the program for its annual meeting scheduled for Apr. 20-21 in St. Louis. A report on "Market Conditions for Zinc-Coated Steel" will be given by F. G. Brown, manager of sales, Sheet & Strip Div., Weirton Steel Co.

Net Sales . . . ACME STEEL CO., Chicago, reports that net sales for 1953 were $76,992,558 compared to $58,039,845 in 1952, an increase of 33 pct.

Completed . . . STANDARD PRESSED STEEL CO. has just completed a $10 million phase of a continuing program of expansion and modernization under which the Jenkintown, Pa., firm has doubled its floor space to 650,000 sq ft in the last 4 years.

Installed . . . WESTINGHOUSE ELECTRIC CORP. has installed a new type generator said to pack twice as much power as was previously possible in a machine of its size at Niagara Mohawk Power Corp.'s Huntley Station in Buffalo.

Awarded . . . DRAVO CORP., Pittsburgh, has been awarded a contract for the construction of a river dock to handle barge shipments of some 2 million tons of coal annually to provide power for an atomic energy plant. Contract was awarded by Yankeetown Dock Corp., Indianapolis, Ind.

"They don't want an efficiency expert!"

Distributor Named . . . GENERAL ELECTRIC CO., Carboloy Dept., Detroit, has named Alden Supply Co., Inc., Philadelphia, as an authorized distributor.

Gets Contract . . . TEMCO AIRCRAFT CORP. has received an Air Force contract calling for de-sealing and re-sealing of fuel tanks on 30 C-54 aircraft.

On Display . . . At the INSTRUMENT SOCIETY OF AMERICA's First International Instrument Congress & Exposition North American Aviation Co. will have on display a scale model of an atomic pilot plant. Exposition will be held in the Philadelphia Convention Hall from Sept. 15-21, 1954.

Annual Scholarships . . . Wheelabrator Foundation, Inc., sponsored by AMERICAN WHEELABRATOR & EQUIPMENT CORP., Mishawaka, Ind., will award college scholarships annually to sons of Wheelabrator employees and to male employees themselves.

Last Load . . . Robert H. Haley, dispatched his last load of steel products last month for American Steel & Wire Div., U. S. STEEL CORP. to cap 51 years of traffic handling for this division.

New Plant . . . S. G. TAYLOR CHAIN CO., Hammond, Ind., has opened a new plant in Pittsburgh, to serve eastern industry and to provide repair services for alloy steel sling chains.

"Executive Development" . . . C. E. Love, executive vice-president and member of the board of directors, Commercial Controls Corp., Rochester, N. Y., will address the Purchasing Agents of Pittsburgh, on April 20. Subject of his talk, to be given at the University Club, will be "Executive Development."

New Distributor . . . THE PARKER APPLIANCE CO., Cleveland, has appointed Power Transmission Products of 1107 N.W. 14th Ave., Portland, Ore., as a distributor for its precision tube fittings line.

This 25-ton induction stirrer is fastened to the bottom of a 90-ton capacity electric arc furnace.
One of the coils for the stirrer, made of Revere rectangular copper tube. Coil is 12 feet long, over 6 feet wide.
Revere Copper
helps stir molten steel

When steel is produced in an electric arc furnace it is highly desirable to stir the molten metal, to assure uniform heat and avoid stratification of the various alloy constituents. Manual and mechanical methods have been used, but the most modern method is electrical—induction stirring. This is accomplished by sending low-frequency two-phase currents through copper coils immediately under the furnace. The magnetic field thus produced stirs the melt most effectively. Stirring can be reversed, and the contents of the furnace made to flow toward either the slag door or the pouring lip.

Because of the heavy currents required, copper's high electrical conductivity makes it essential. Since the stirring coils are close to the furnace, they must be water cooled, distilled water being used in a closed system. Copper's high thermal conductivity is vital here. The basic copper for the stirrers made by Elliott Company, Ridgway, Pa. for Aros Electric, Inc., New York, is Revere rectangular tube, .945" x .750", .157" wall. Elliott and Revere technical personnel worked closely on the problem of specifications, arriving at joint agreements on tolerances and temper suitable for bending. These proved successful from the start, again showing the value of close collaboration between Revere and its customers . . . If you have a problem in connection with copper and its alloys, and aluminum alloys, consult Revere. See the nearest Sales Office.

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End of Road for Piston Engines?

Current tooling program may be last for reciprocating powerplants . . . Gas turbine is logical successor . . . Chrysler displays prototype . . . Change in 10 years—*By R. D. Raddant.*

It is a better than even money bet that when current tooling programs now underway in the auto industry are completed, it will be the end of tooling for reciprocating gasoline engines.

And it's an equally safe bet that the end of the present reciprocating engines will bring an automotive styling evolution more significant than any since the advent of streamlining.

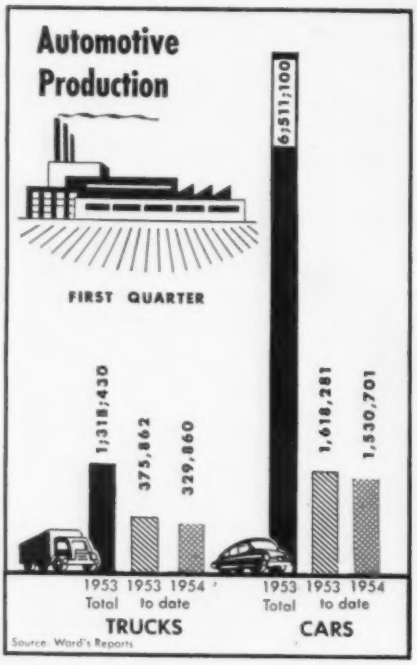
Logical Successor . . . These conclusions are not wild guesses. They are logical assumptions that seem inevitable after discussion with its developers of the possibilities of Chrysler's regenerative gas turbine engine.

This particular engine, shown currently for the first time at the "Easter Parade of Stars" in New York, won't be around when gas turbine engines are installed in passenger cars on a production basis. But its effectiveness indicates that the gas turbine is the logical sucessor to the conventional reciprocating engine. The engine is one of ten developed and tested by Chrysler in a 10-year, $2 million program.

For further news of Gas Turbines, see p. 67

But Not Yet . . . George J. Huebner, Jr., executive engineer in charge of Chrysler research, has made it very clear that "no one should regard the development of this particular experimental gas turbine as an indication that we are anywhere near the point where commercial production of gas turbine engines for passenger cars can be considered."

But it doesn't have to be to justify these conclusions. The point is that every auto maker either has or is in the process of developing a new overhead valve V-8 engine. These engine plants cost many millions and tooling costs won't be written off for more than a decade at the earliest. By the time the industry as a whole is ready for new engines, the gas turbine, or possibly something that isn't even discussed yet, may be the logical step to take rather than to try to improve on present engines.



Passed Peak? . . . Furthermore, many automotive engineers believe that the limits of the reciprocating engine may be approached when present engines are pushed to their maximum output. In other words, the conventional engine may have reached the point of diminishing returns.

This isn't a discussion of technical problems to be solved, but it should be pointed out that many problems remain in material cost and procurement, in metallurgy, and in manufacturing before the gas turbine becomes practical.

The big secret, and one that Chrysler intends to preserve, is the regenerator. This feeds hot exhaust gases back into a heat exchanger to boost engine efficiency.

Old But Unconventional . . . "It's an old principle, but an unconventional approach," Mr. Huebner says slyly. "We would like to hold onto it a while longer."

Another problem, that may have contributed to certain complications elsewhere in the industry in gas turbine development, is gyroscopic force. This did not reach any serious proportion in the Chrysler engine, but was, in fact, less than a reciprocating engine.

Any completely new type of engine, whether it is the gas turbine or something more futuristic, will have a profound effect on styling. The Chrysler engine was placed in a conventional car to emphasize its practicality. But to build a car around a gas turbine engine would be something else.

Engine In Rear? . . . The public is accustomed to a front engine car with its hood and radiator. A gas turbine would not, of course, require a radiator and a rear location for the engine might be more logical. The future engines will probably be much lighter and weight distribution may have to be handled differently.

Through use of a regenerator, Chrysler engineers are confident that a thermal efficiency as high as 40 pct is possible compared to ranges of 24 to 27 pct in today's engines. And it will run on any petroleum fuel that is available in abundance. This in itself is a big point to the petroleum industry which is constantly being pressed by the auto industry for

higher and higher octane products.

Sales Reports . . . Ford had some important things to talk about last week in its latest report on production and the do-or-die race with Chevrolet.

L. W. Smead, general sales manager, reports that Ford cars and trucks have held registration leadership for the past 6 months. At the same time, Ford sales for the first quarter were the highest in 30 years at 377,545 units. Lincoln-Mercury Div. reported its all time first quarter high of 75,444 sales of Mercurys during the first 3 months.

On the other side of the picture, Buick happily announced taking over third place in sales. Ivan L. Wiles, Buick general manager, said March deliveries put Buick in the top three, replacing Plymouth, regular third place holder.

Also on the GM credit side was the announcement that Cadillac has jumped its regular 8-hour day to a 10-hour shift. This will result in production of 560 Cadillacs a day, about 25 pct over normal.

Dagmar in Brightwork

Like workers in every trade or industry, auto workers have developed a slang all their own. But unlike the basic industries, such as steel, conditions and models vary from company to company and the terminology is less universal.

For example, the 1951 Ford grille center section, which boasted twin rounded spinners, if you recall, was quickly named "Dagmar." Obviously, this would not apply on a model whose grille was made up of thin, uncurved chrome strips.

Sergeant's stripes are chrome strips attached diagonally to the rear door or quarter panel. Hockey sticks and bananas are grille parts shaped like their nicknames. A dog leg is a curve in the body at the bottom of the rear door.

Railroad tracks run around the rear window of the Ford Victoria and Skyliner. They are grooved chrome trim. Spaghetti is used to seal body joints and the stovepipe is the ventilator tube that brings fresh air to the heater.

Extras:

Plan electro-hydraulic system to power auto appliances.

The time may be approaching when the list of powered extras or appliances is getting out of hand, at least for conventional power sources.

Seat lifts, window lifts, power steering, power brakes, air conditioning, windshield wipers and a host of others all demand power for their operation.

A top authority in this entire field, L. H. Middleton, vice-president and director of engineering of Electric Auto-Lite Co., now predicts that the time has come to wrap up all of these power eating devices in one bundle with a single electro-hydraulic system.

Mr. Middleton predicts that this probably will lead to the introduction of unheard of additional push button jobs.

Automotive Production
(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Apr. 10, 1954..	133,333*	23,739*
Apr. 3, 1954..	122,752	23,746
Apr. 11, 1953..	144,352	32,430
Apr. 4, 1953..	138,648	31,919

*Estimated. Source: *Ward's Reports*

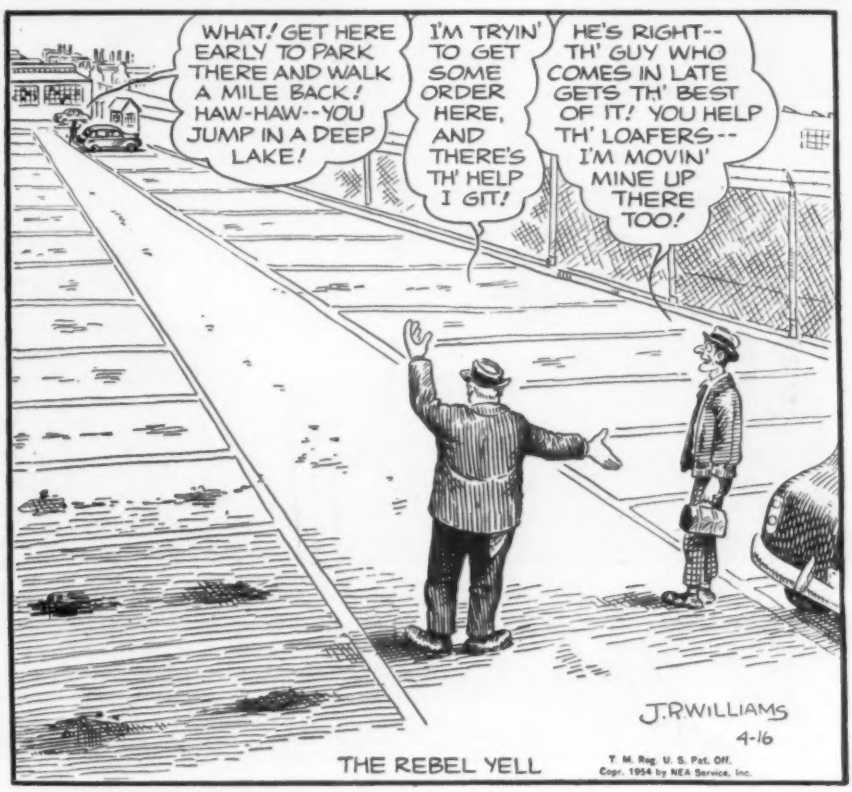
May Come Soon

These include built in jacks, hydraulically opened doors, automatic hood and rear deck openers, and even sliding tops.

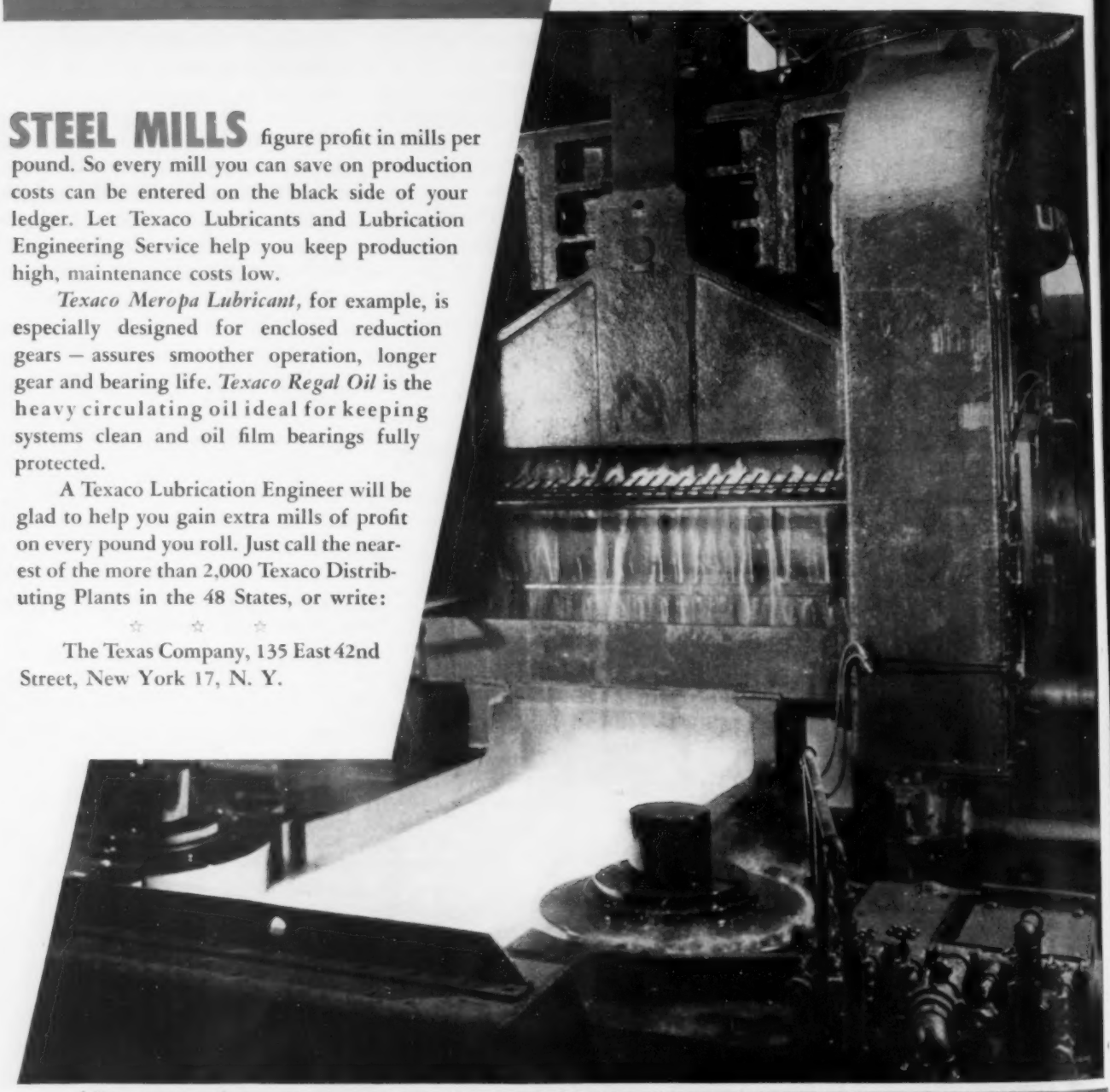
Here are some other developments predicted by Mr. Middleton for the near future:

Increased use of the supercharger to get increased efficiency out of today's gas; instantaneous heating; a new combination heating and air conditioning unit at a retail cost of $200; and improved braking with an approach more radical than merely improvements in the present disc or drum brake.

THE BULL OF THE WOODS — By J. R. Williams


WHAT! GET HERE EARLY TO PARK THERE AND WALK A MILE BACK! HAW-HAW--YOU JUMP IN A DEEP LAKE!
I'M TRYIN' TO GET SOME ORDER HERE, AND THERE'S TH' HELP I GIT!
HE'S RIGHT-- TH' GUY WHO COMES IN LATE GETS TH' BEST OF IT! YOU HELP TH' LOAFERS-- I'M MOVIN' MINE UP THERE TOO!
J.R.WILLIAMS 4-16
THE REBEL YELL
T. M. Reg. U. S. Pat. Off. Copr. 1954 by NEA Service, Inc.

PROFIT IN MILLS



STEEL MILLS figure profit in mills per pound. So every mill you can save on production costs can be entered on the black side of your ledger. Let Texaco Lubricants and Lubrication Engineering Service help you keep production high, maintenance costs low.

Texaco Meropa Lubricant, for example, is especially designed for enclosed reduction gears — assures smoother operation, longer gear and bearing life. *Texaco Regal Oil* is the heavy circulating oil ideal for keeping systems clean and oil film bearings fully protected.

A Texaco Lubrication Engineer will be glad to help you gain extra mills of profit on every pound you roll. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

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The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Lubricants, Fuels and Lubrication Engineering Service

TUNE IN . . . METROPOLITAN OPERA radio broadcasts every Saturday afternoon. See newspaper for time and station.

Congress Stays Wary on Red Trade

Some Administration sources believe non-strategic trade with Reds is inevitable . . . But many congressmen opposed . . . Against support of foreign competition . . . By G. H. Baker.

Trading in non-military commodities between the U. S. and the communist areas of the world may be inevitable in the long run. A number of Administration officials believe this with firm conviction. Congress, however, is far from convinced.

The past decade of Soviet treachery—including both economic and political betrayals—is branded deep in the memories of both Republican and Democratic congressmen. Add to this the ominous H-bomb data of recent weeks and the result is a grim-faced collection of legislators with some very tough views on what they call "trading with the enemy."

What's Non-strategic? . . . The Foreign Operations Administration, headed by Harold Stassen, wants to open up what it calls "non-strategic" trade with Red-dominated countries. What Congress wants to know is this: **What** is strategic? Would U. S. machine tools, for example, be employed by the Soviets in the production of civilian goods? Or would they be geared by the Reds for output of war implements?

Rep. Clement J. Zablocki, D., Wis., points out that there's plenty of sentiment within Congress for writing a ban on U. S. shipments to any area which trades with the Communists. Mr. Stassen opposes such a move. It would defeat U. S. interests to cut off the Reds from our goods, he believes.

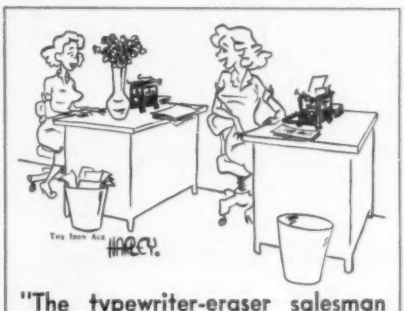
Help Foreign Competition . . . The real sore spot to congressmen from industrial areas is the Administration's policy (started under Mr. Truman) of financing West European manufacturing which competes directly with U. S. production.

There is idle productive capacity and unemployment in many U. S. industries and in a number of U. S. cities, and these congressmen don't believe we should give contracts for such products as automotive parts and aircraft components to French and Italian firms.

Distressed areas at home are clamoring for priority on such work. But there appears to be little hope of their getting it unless and until Mr. Stassen reverses this "giveaway" policy, as it's been called by industrial-area congressmen.

Protests Don't Work . . . In spite of mounting complaints from southern states, the Eisenhower Administration shows no indication of budging from its policy of channeling defense contracts into areas of acute unemployment. (Governor Byrnes of South Carolina refers to the Administration's surplus manpower policy as "the Marshall Plan for New England.")

Office of Defense Mobilization apparently is determined to keep the policy (known as Manpower Policy No. 4) on the books indefinitely. It shows no sign of yielding to complaints from southern states where lower costs may permit lower bids on government contracts.



"The typewriter-eraser salesman left them for you."

SECRETARY WEEKS gives Dept. of Commerce medal to Samuel J. Rosenberg for 30 years of "meritorious service."

The South's annoyance at seeing attractive government contracts awarded to relatively high-cost areas is not diminishing, for new U. S. Labor Dept. data show that 40 additional major labor market areas now have surpluses of manpower. This means that these areas now are in a position to catch defense contracts that otherwise might be awarded to low-cost southern cities.

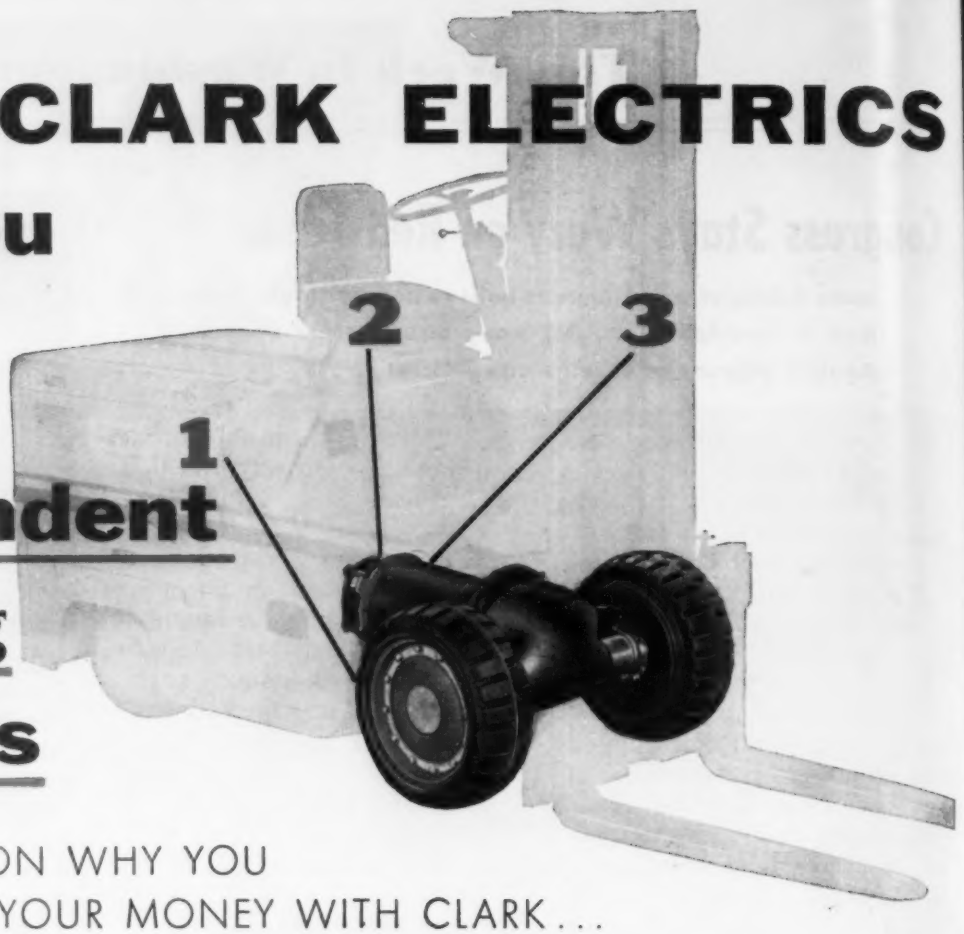
Speed Surplus Sale . . . Speed in the sale of military-owned surplus property is the aim of a new agreement between the Defense Dept. and General Services Administration (GSA).

Provided by the agreement are shorter periods of screening by other potential federal users of GSA-reportable types of property and establishment of a single non-reportable property list.

On an average, Defense Dept. says, the time saved in clearing reportable property for sale will be about 75 to 80 days.

Reportable items valued at more than $300, including vehicles, machine tools, hardware, and electronic products, now are subject

ONLY CLARK ELECTRICS give you 3 independent braking systems



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2 "Dead-man" brake on the armature shaft: this positive acting brake takes hold automatically the instant that the driver leaves the truck—disconnects the power, returns all controls to neutral, assures that the truck will *remain* stationary.

3 Dynamic braking by reversing current through the drive motor: this braking method permits smooth deceleration, with no grabbing; but positive automatic control eliminates all danger of damage to electrical motors and controls.

This three-way braking system is another exclusive feature of Clark electric fork trucks—the safest electric trucks on the market. It's another good reason for talking to your local CLARK dealer (see the Yellow Pages of your phone book) when you're in the market for electric fork trucks.

And remember: Only Clark has no axe to grind for any particular type of truck. We produce them all: gas, electric, diesel and L.P.G. fork trucks; POWRWORKER hand trucks; ROSS Carriers. For unbiased experienced counsel, see your Clark dealer today.

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CLARK EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
BATTLE CREEK 51, MICHIGAN

to a 90-day screening period by GSA before they are authorized for sale by Defense Dept. Office furniture and supplies will be released for sale automatically after 120 days.

Atomic Power:

More firms to study industrial use of nuclear power.

One-year, self-supported studies of possible industrial uses of nuclear power are being started by American Machine & Foundry Co., Babcock & Wilcox Co., and Bendix Aviation Corp.

They have previously worked on nuclear power projects and are undertaking the programs on the basis of separate agreements newly signed with Atomic Energy Commission.

Study Future Uses

American Machine & Foundry will examine the need for machines and equipment specially adapted to atomic power purposes. It will also look into the development of low-power reactors for industrial research.

Design needs leading to eventual manufacture of nuclear power equipment will be explored by Babcock & Wilcox. This project and other work related to it will be handled by an atomic energy division which has recently been established in the company.

Plan New Applications

Bendix Aviation will aim its study toward future applications of atomic power and by-products, anticipating the development of new reactor designs. In cooperation with Oak Ridge National Laboratory, Bendix now is engaged in some reactor studies.

Signing of agreements with these three firms brings to 11 the number of studies being performed in the AEC industrial participation program by individual companies or groups of companies interested in the value of nuclear energy to an ever growing list of civilian enterprises.

Construction:

First period reports bolster estimates of record year.

Earlier forecasts that 1954 would turn out as another record-breaking year for construction seem justified on the basis of first quarter reports compiled by U. S. Bureau of Labor Statistics.

Preliminary figures indicate a total building activity in excess of $7.3 billion—a record in itself. After adjustment for seasonal factors, this is an annual rate of $36 billion.

This is considerably above the first-of-the-year forecast and well above last year's record figure of $34 billion plus.

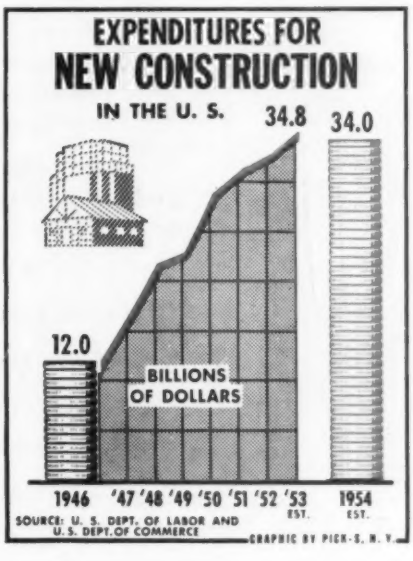
Home Building Strong

Among major types of privately financed construction, expenditures so far this year have been lower only for industrial construction, down about 12 pct, and farm construction, down 10 pct.

Store, warehouse and other commercial type construction has jumped 44 pct to nearly $500 million for the 3-month period.

Officials say this is geared directly to residential construction which is running at about last year's level —about $2.2 billion annual expenditure and above the million-unit level.

There's no decline in sight for home construction, Labor Dept. experts say, which forecasts a continued high demand for additional commercial building to keep up with the growing number of households.


EXPENDITURES FOR
NEW CONSTRUCTION
IN THE U. S.
34.8
34.0
12.0
BILLIONS OF DOLLARS
1946 '47 '48 '49 '50 '51 '52 '53 EST. 1954 EST.
SOURCE: U. S. DEPT. OF LABOR AND U. S. DEPT. OF COMMERCE
GRAPHIC BY PICK-S, N. Y.

GSA Moves to Cash in Mortgages

General Services Administration is in the middle of a program to cash in its mortgages now held on steel and aluminum plants, ordnance works, shipyards, and other former government-owned facilities which have been sold to private enterprise.

Mortgage holdings of GSA on such plants still amount to about $140 million. It is felt that this move would bring working cash into the Treasury and at the same time get GSA out from under its load of financial paper work.

Campaign calls for contacting about 400 concerns and suggesting that they refinance their holdings through private banking firms, perhaps obtaining a more favorable rate of interest than the 4 pct now being paid the government.

Name Pike to Logistics Post

President Eisenhower's choice to become the Defense Dept. chief of logistics is Thomas P. Pike, former head of the Thomas P. Pike Drilling Co., Los Angeles.

Mr. Pike was named last week to succeed Charles S. Thomas as Assistant Defense Secretary (Logistics) when the latter becomes the new Navy Secretary. At present Mr. Pike is deputy Assistant Secretary for Logistics.

Another nominee to a Defense Dept. post last week was Wilbur M. Brucker, Detroit attorney and former governor of Michigan. Mr. Brucker is the White House selection to become general counsel of the Defense Dept., succeeding H. Struve Hensel.

Name BDSA Chemical Rubber Head

Direction of the Chemical & Rubber Div. of Business & Defense Services Administration has been taken over by Harold H. Smith. Mr. Smith is on loan to the government from Dow Chemical Co.'s Western Div.

Which is the CleCap?

...the outsize one that nobody else makes

One of the advantages CleCap customers enjoy is the knowledge that when they want some of those BIG cap screws, the chances are 9 out of 10 we can ship them the same day.

CLEVELAND *Top Quality* FASTENERS

Ferrous and Non-Ferrous

Hex Head Cap Screws—Bright and High Carbon Heat Treated Steel, Brass, Silicon Bronze, Stainless Steel; ¼" to 2½" dia.

Socket Head Cap and Set Screws—Plain and Knurled ¼" to 1½" dia. Also Flat and Button Head Styles.

Flat Head Cap Screws: ¼" to 1" dia.

Fillister Head: ¼" to 1¼" dia.

Set Screws—Square Head: ¼" to 1½" dia.

Milled Studs: ¼" to 1¼" dia.

Place Bolts: ¼" to 1½".

Structural Bolts to ASTM Specification A325

Tractor Bolts

Special Hot and Cold Headed Parts

Facilities to make larger diameters than listed.

CleCap makes 'em from ¼" to 2½" diameters, any length you want—ferrous and non-ferrous—and we stock a lot of unusual sizes, nearly 10,000 different items last count.

That's another reason for dealing with *The* cap screw specialists of the country. You also get unbeatable top-quality fasteners . . . PLUS a CleCap crew that has a long-made rep for "busting a leg" to get you what you want exactly when you want it.

What happens to your profits when late deliveries hold up production lines? Put your cap screw needs up to CleCap . . . and relax!

Ask Your Jobber for CleCap!

The Cleveland Cap Screw Co.

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Warehouses: Chicago • Philadelphia • New York • Providence • Los Angeles

Originators of the Kaufman DOUBLE EXTRUSION Process

Hold Off Steel Orders Till Mid-Year

Though inventories near normal, California metalworkers plan little resumption of steel buying before mid-year . . . Quick mill delivery a factor—*By T. M. Rohan.*

California metalworking plants have largely worked down their inventories to near normal but plan little resumption of buying before mid-year.

A regional check of purchasing agents last week by THE IRON AGE disclosed PA's are sitting pretty with only relatively minor inventory overbalance in some instances. Indications were that fast service by steel mills in shipping earlier than expected is now backfiring in the form of very short deliveries raising hob with rolling schedules.

Hold Off Orders . . . "Specifying delivery in May used to mean you'd get it in late June," one PA said. "Now it means you get it the second week in May, so we just hold off until we're down to about 3-5 weeks before ordering."

With only a few exceptions due to government stretchouts on defense items, purchasing agents said second quarter outlook is at least as good and in most cases better than the first quarter.

One Strike Hedger . . . Only one fabricator has upped purchasing schedules based on possibility of a nationwide steel strike. Although denied by the prime contractor, a major construction firm official said he had placed normal June orders for steel for May on urging of his contractor as a hedge against possibility of a steel strike.

On specialty steels eastern and midwestern producers are offering better service than local suppliers and meeting local California delivered prices, another steel buyer stated. "Apparently it's easier for them to accumulate sufficient tonnage of specialty steels than our local suppliers so we actually get better service from them," he said.

The New York dock strike, however, cut into some Eastern tonnage for this firm. Steel shipped Feb. 15 arrived in California only last week.

Cautious Buying . . . A southern California appliance and automotive producer said purchasing is now about 25 pct under normal and will continue so until July. Present inventory is 75 days which will be reduced to 60 days.

A container manufacturer said demand for his product in petroleum and similar fields has been fluctuating widely. Petroleum men find they can get fast service and, like the fabricators, hold off on ordering.

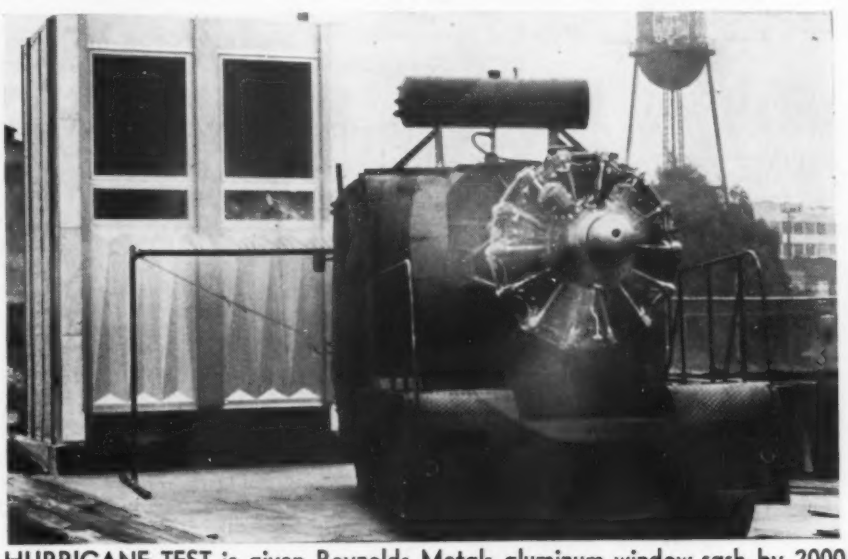
Prefer No Inventory . . . Another major Los Angeles purchasing agent said if he could start from scratch, he'd carry almost no inventory. In raw steel supplies for automotive parts, he's down to 30 days with no increase planned for the near future.

On specialty steel from eastern suppliers, inventories are excessive since lead time is longer to allow for transportation. For this firm 30 days has now become normal compared to over 60 in late 1953. Second quarter outlook is "not glorious, but OK," said this purchasing agent.

Seidelhuber Plan . . . Apr. 26 has been set as the date for the hearing on a plan to dispose of the Seidelhuber Steel Rolling Mill Corp.

The plan to be considered was proposed by the Price Iron and Steel Co. of Chicago, a company which is a $200,000 creditor of the corporation. Price has asked that physical assets of the mill be turned over to the Reconstruction Finance Corp. to satisfy a $760,000 government loan.

Price would then waive its $200,000 interest and in turn would loan to Seidelhuber an additional $250,000 for one year. By this means Price would affect a merger with Seidelhuber, and the losses of that firm could be deducted from the income taxes of Price.

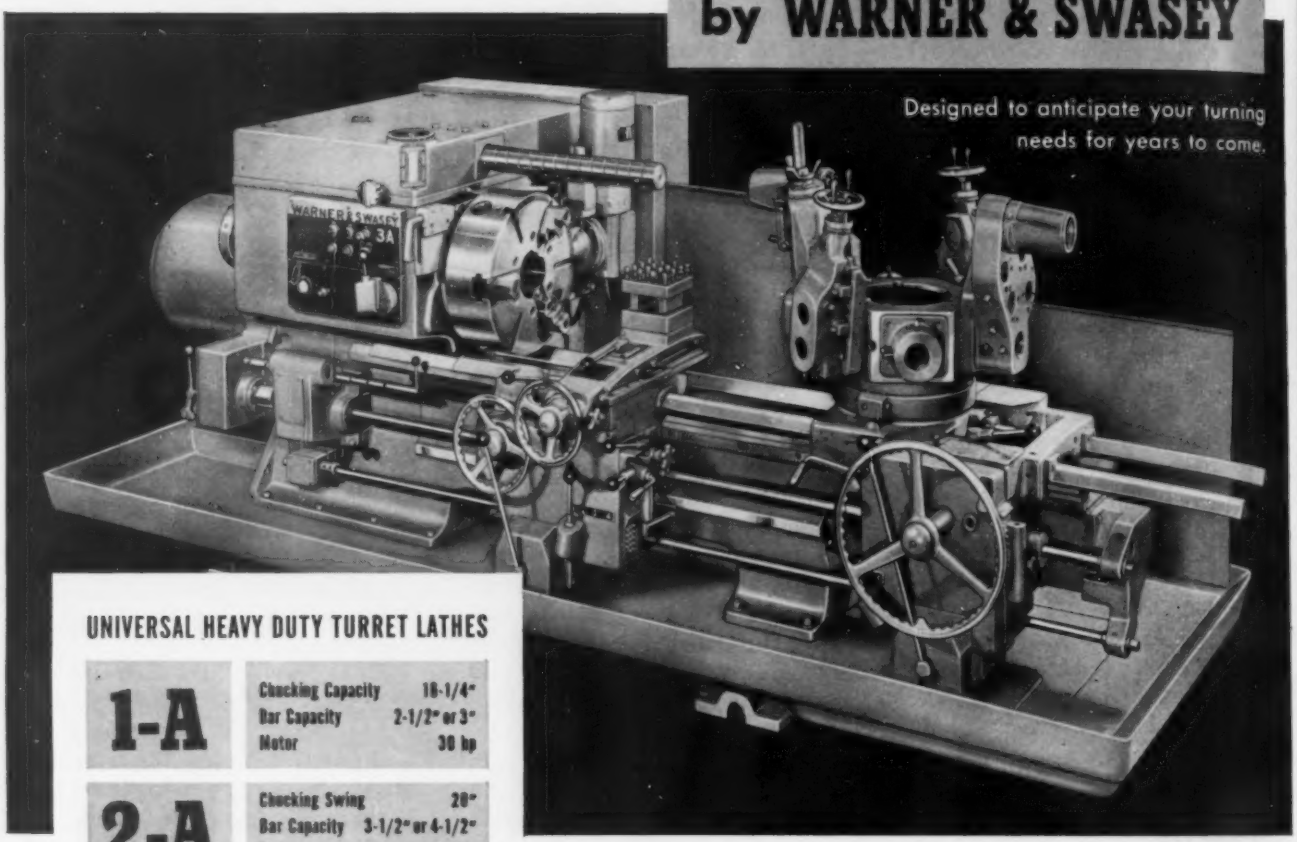


HURRICANE TEST is given Reynolds Metals aluminum window sash by 2000 hp aircraft engine and propeller.

COMPLETELY NEW!

A whole new line of saddle type turret lathes...

by WARNER & SWASEY



UNIVERSAL HEAVY DUTY TURRET LATHES

1-A	Chucking Capacity	18-1/4"
	Bar Capacity	2-1/2" or 3"
	Motor	30 hp
2-A	Chucking Swing	28"
	Bar Capacity	3-1/2" or 4-1/2"
	Motor	40 hp
3-A	Chucking Swing	23-1/2"
	Bar Capacity	4-1/2" or 6"
	Motor	60 hp
4-A	Chucking Swing	28-1/4"
	Bar Capacity	9" or 12"
	Motor	75 hp

MORE POWER—increased up to 75 hp. in new 4-A! Gives you more than enough power for any job—faster removal of metal at all speeds!

MORE SPEEDS—16 speeds with smaller increments provide ideal speeds for *more* work diameters, increased production and tool life! 32 *un-duplicated* speeds with 2-speed motor!

AUTOMATIC SPEED CHANGES—automatic hydraulic gear shifting in a matter of seconds on 2-A, 3-A and 4-A—boosts production, cuts operator fatigue! New 1-A's constant-mesh gear train with hydraulic clutches *eliminates* gear shifting completely!

SIMPLIFIED ZONE CONTROLS—eliminate waste motion and facilitate machine handling—increase operator efficiency! Single master control lever controls gear shifting, spindle stops, starts, and reverses!

IMPROVED ATTACHMENTS—Hydraulic chuck and bar feed with power return—for easier handling, less operator fatigue! New power chuck wrench eliminates back-breaking effort when chucking. Does not obstruct spindle bore!

RETAINS STANDARD WARNER & SWASEY TOOLING—all existing saddle type tools of the world's largest and most complete line can be used on these new turret lathes.

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY

Can the Job Shop Be Automated?

Automation was once thought restricted to big volume industries . . . But one firm now working on small automated honing machine . . . Design requirements—*By E. J. Egan.*

The manufacturing manager of a large metalworking plant scoffed at talk of a possible depression: "Sure, a lot of us are still shifting gears from a big defense effort to a real scrap for the civilian dollar. But I can't see a real depression for a lot of reasons.

"One of the country's best guarantees against a prolonged slump is the terrific rate of improvement in everything.

Case History Proof . . . There is plenty of evidence in the metalworking industry to bear out this appraisal. One example is the case of an equipment manufacturer who recently announced a promising new metalworking method and appropriate machinery to do the job.

At the first public demonstration of the operation and equipment, the builder graciously accepted the compliments of the audience.

Didn't Know Price . . . When pressed for details of price and delivery the manufacturer was slightly embarrassed. As a matter of fact, he'd not be too keen about selling the present machines —they were just about obsolete the way they stood!

In testing the first models, the ideas for new applications and improvements came too fast to be denied. They simply had to be incorporated into a better design.

Only for Volume . . . What about this rapid "rate of change" as it applies to automation?

The automation technique is usually conceded to be in its infancy when it comes to machining of metals. And many have firmly predicted that this type of push-button handling and cutting will never work outside the big-volume industries.

Automation Has Bugs . . . But some of these firm predictions are wavering. The concept of automation seems to be too challenging and dynamic to be confined to certain industries.

There are still plenty of trouble spots in some automated lines. Adequate maintenance of complicated control setups is one big problem; switches, timers, relays, contacts are not altogether foolproof.

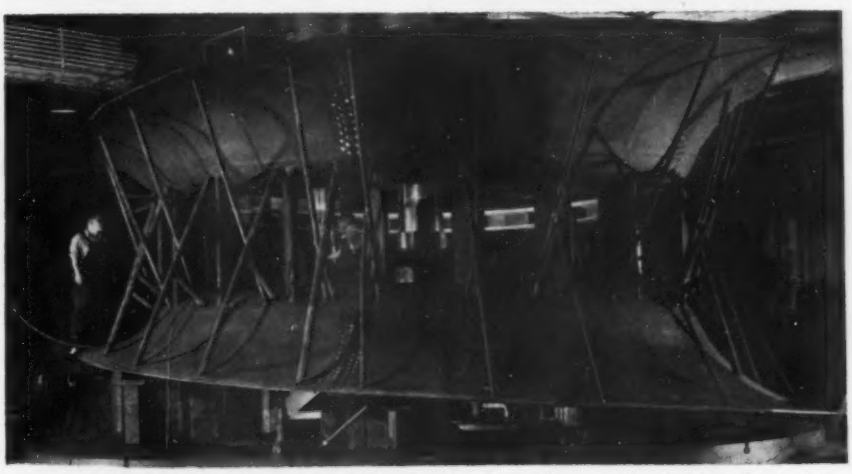
Sometimes the right quantity and quality of maintenance personnel is not easily substituted for displaced machine tool operators. These difficulties are gradually being overcome. Automotive and other mass production industries are cautiously planning new uses for integrated loading, machining and transfer mechanism.

Find New Market . . . Even as this is being done, farsighted machine tool builders are measuring the job machine shop for automation.

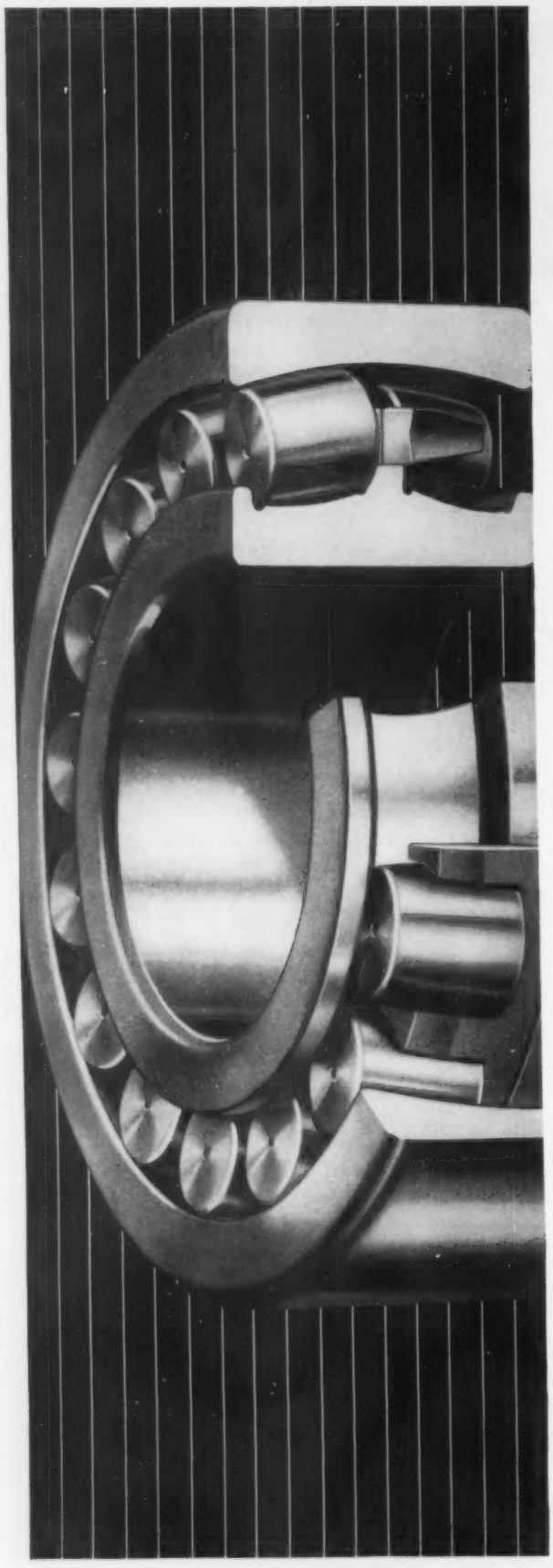
Can these smaller machine tools be automated? One affirmative answer came out of the recent Westinghouse Machine Tool Electrification Forum at Buffalo, N. Y. Prime requisites for the necessary machine designs were outlined in a paper presented by E. L. Behringer of the Micromatic Hone Corp., Detroit:

(1) Suitable pre-operation parts storage.
(2) A self-controlled demand system of preloading.
(3) Automatic positioning and clamping of the workpiece.
(4) Termination of the machining cycle by an automatic measurement of the workpiece.
(5) The machine should be self-checking.
(6) Selection and segregation of the workpieces by size variation as they leave the machine.
(7) Interruption of the automatic cycle if parts are being rejected, or if tools need replacing.

The Detroit firm has been guided by these principles in manufacturing a small automated unit for honing the ID of two separate sets of soft gear blanks and hardened gears.



ON A CAROUSEL: Stay ring with attached scroll case for hydraulic turbine is machined on boring mill at Allis Chalmers.



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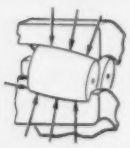
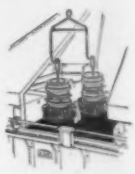
TORRINGTON

Spherical Roller Bearings

Uniform, close control of precision-ground contact surfaces—for even load distribution and maximum bearing life.



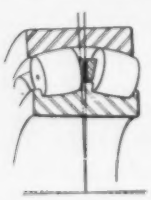
Accurate geometrical conformity between races and rollers—for ultimate load carrying capacity and performance.



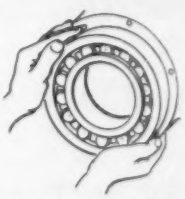
Races and rollers heat treated according to the most advanced metallurgical procedures—for maximum durability.

Individual one-piece cage for each path of rollers—assures freedom of operation.

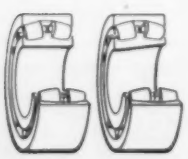
Integral flange on inner race—to give radial stability and positioning for thrust loads—both essential to satisfactory performance.



Self-aligning—for continuous, free-rolling service under shock loads and at sustained speeds.



Unit assembly—for easy, economical handling.



Available from stock with either straight or tapered bore—for shaft or adapter mounting.

These are advantages that give you long, efficient, low-maintenance service in the toughest heavy-duty application. **To get maximum value for your bearing dollar, *specify TORRINGTON Spherical Roller Bearings.***

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South Bend 21, Ind. • Torrington, Conn.

TORRINGTON *SPHERICAL ROLLER* **BEARINGS**

Spherical Roller • Tapered Roller • Cylindrical Roller • Needle • Ball • Needle Rollers

REPORT TO MANAGEMENT..

Recession end in September

You can expect our mild recession to continue for several months but any chance it will trigger an economic crisis is out. Watch for a significant business upturn in early September.

Look for these factors to brake possibility of our heading into a serious decline:

(1) Defense spending is running around $40-$41 billion. This support alone is enough to prevent a severe emergency.

(2) Consumer savings are at near record levels and even though personal income is down slightly, tax breaks have increased buying power.

(3) Construction industry is booming, may top even 1953.

(4) Manufacturers have been forced to make better products, hold or cut prices, put steam behind their sales effort. With this combination they can't help but score--soon.

(5) Inventory cutbacks for some firms will be completed by late April, May. Others will have stocks where they want them by September.

(6) Marriages, births are continuing at high rates.

(7) Flush is still on travel, clothing sales, small appliances.

How deep is metalworking cut?

How severely will the current recession affect metalworking? You can figure steel output through mid-1954 will be 15-20 pct below the 1953 average. For the rest of metalworking: production will be off 10 to 15 pct during the first 6 months of this year compared to 1953 high points.

But profits won't show so severe a dip. End of excess profits tax, changes in the new tax reform bill, increased productivity, reduction in overtime pay, less use of marginal production equipment will help prevent your profits from slipping badly.

What will cause upturn?

What will cause business to start climbing again in September? Mainly change in industry, business thinking from worry about how bad the recession's going to be to aggressive planning on how to increase sales. Consumer confidence will strengthen also.

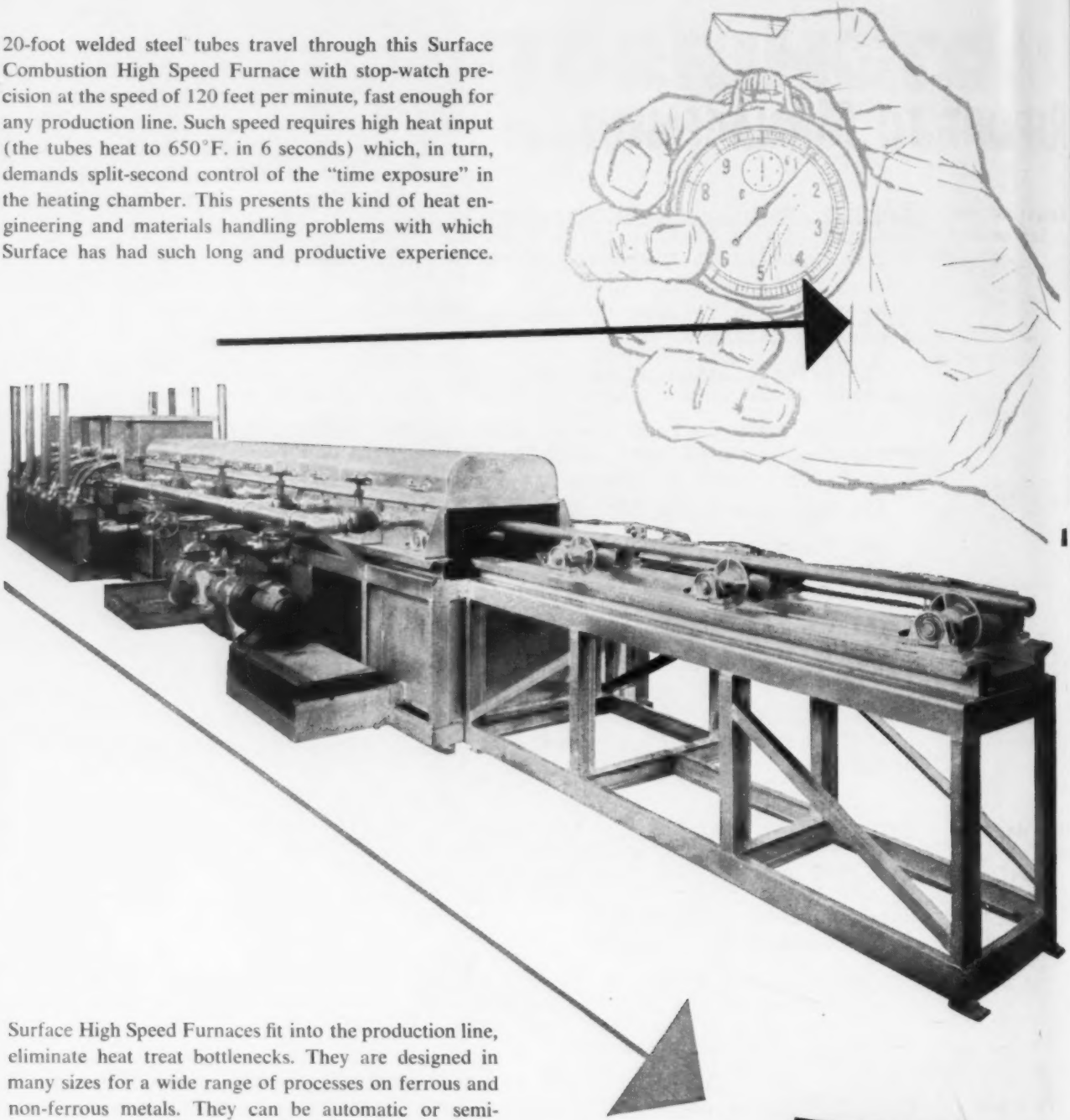
You can look for stepped up school building, housing, road construction to help turn the downtrend. Easier credit, expenditures for H-bomb defense, spread of installment buying are other stimulants that will help.

New product push

And new, improved products coming out soon will keep the economy surging . . . Automakers will be marketing new or completely restyled '55 models . . . You can bet color TV will sell much faster than many industry sources now expect, and prices will be reduced much more rapidly than manufacturers now indicate . . . Look for continued buildup of the airconditioning boom.

stress relieving at 120 feet/minute

20-foot welded steel tubes travel through this Surface Combustion High Speed Furnace with stop-watch precision at the speed of 120 feet per minute, fast enough for any production line. Such speed requires high heat input (the tubes heat to 650°F. in 6 seconds) which, in turn, demands split-second control of the "time exposure" in the heating chamber. This presents the kind of heat engineering and materials handling problems with which Surface has had such long and productive experience.



Surface High Speed Furnaces fit into the production line, eliminate heat treat bottlenecks. They are designed in many sizes for a wide range of processes on ferrous and non-ferrous metals. They can be automatic or semi-automatic, gas or oil fired. Write for Literature Group H53-5 and see how these "hot-rod" furnaces can give you savings in heating time, equipment cost, fuel, maintenance, floor space, metal, and labor.

Surface
HEAT TREATING EQUIPMENT

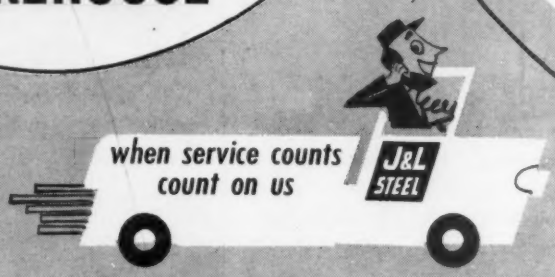
SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO

ALSO MAKERS OF
Kathabar HUMIDITY CONDITIONING *Janitrol* AUTOMATIC SPACE HEATING

going down the drain... need help?

Call your nearest

J&L STEEL WAREHOUSE



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STANDARD PRODUCTS: Hot Rolled and Cold Finished Bars and Shapes • Structural Shapes • Carbon and Hi-Tensile Plates • Hot and Cold Rolled Strip and Sheets • Wire Products • "Precisionbilt" Wire Rope.

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Jones & Laughlin

STEEL CORPORATION — *Warehouse Division*

Customers now demand strapped pallets that cut shipper's cost 50%!

A Signode unitizing method that can work for you!

Signode's Packaging Engineers have an uncanny way of adapting basic *unitizing principles* to help shippers cut packaging costs!

These products are hard-to-pack grinding wheels. Manufacturers formerly shipped them in wooden boxes—4 wheels to the box. Signode Engineers bundled four stacks of 6 wheels with steel strapping and bound them into ONE easy-to-handle pallet of 24 wheels—at a 50% saving in packaging costs!

This Signode-developed pallet pack proved so popular that customers of almost all grinding wheel makers have requested that wheels must now be shipped on steel strapped pallets!

If you are interested in cutting packaging costs in your own plant, send for our folder showing 6 BASIC WAYS OF UNITIZING.

SIGNODE Steel Strapping Co.

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—Free Publications—

Continued

V-belt films

Second group in a series of educational 35mm sound slidefilms for industry is now available through Allis-Chalmers General Machinery Div. Three slidefilms are on subject of v-belt drives and are entitled, *In Every V-Belt Drive, For Better Driving,* and *Selecting A Drive.* Films make good use of drawings, humor and step-by-step photographs. *Allis-Chalmers Mfg. Co.*

For free copy circle No. 25 on postcard, p. 97.

Fans

Visual index and information on Hartzell cooling tower, heat exchanger and mine fans are included in recent brochure available from company. *Hartzell Propeller Fan Co.*

For free copy circle No. 26 on postcard, p. 97.

Conveyor belts

Hot material conveyor belts made with rayon fabric reinforcement are featured in new catalog section on hot material belts. Rubber conveyor belts made with rayon are said to be thinner, dissipate heat more quickly and offer greater ply adhesion than cotton fabric belts. *B. F. Goodrich Co.*

For free copy circle No. 27 on postcard, p. 97.

Business booklet

Basic Refractories, Inc., has announced the publication of a new booklet illustrating its 1953 "Big Business" national advertising series. *Basic Refractories, Inc.*

For free copy circle No. 28 on postcard, p. 97.

Furnaces

New bulletin on Allcase batch type controlled atmosphere furnace has been issued. Folder completely describes features of standard and heavy duty sizes of this radiant tube heated furnace. Included are detailed construction drawings and photographs of typical process applications. *Surface Combustion Corp.*

For free copy circle No. 29 on postcard, p. 97.

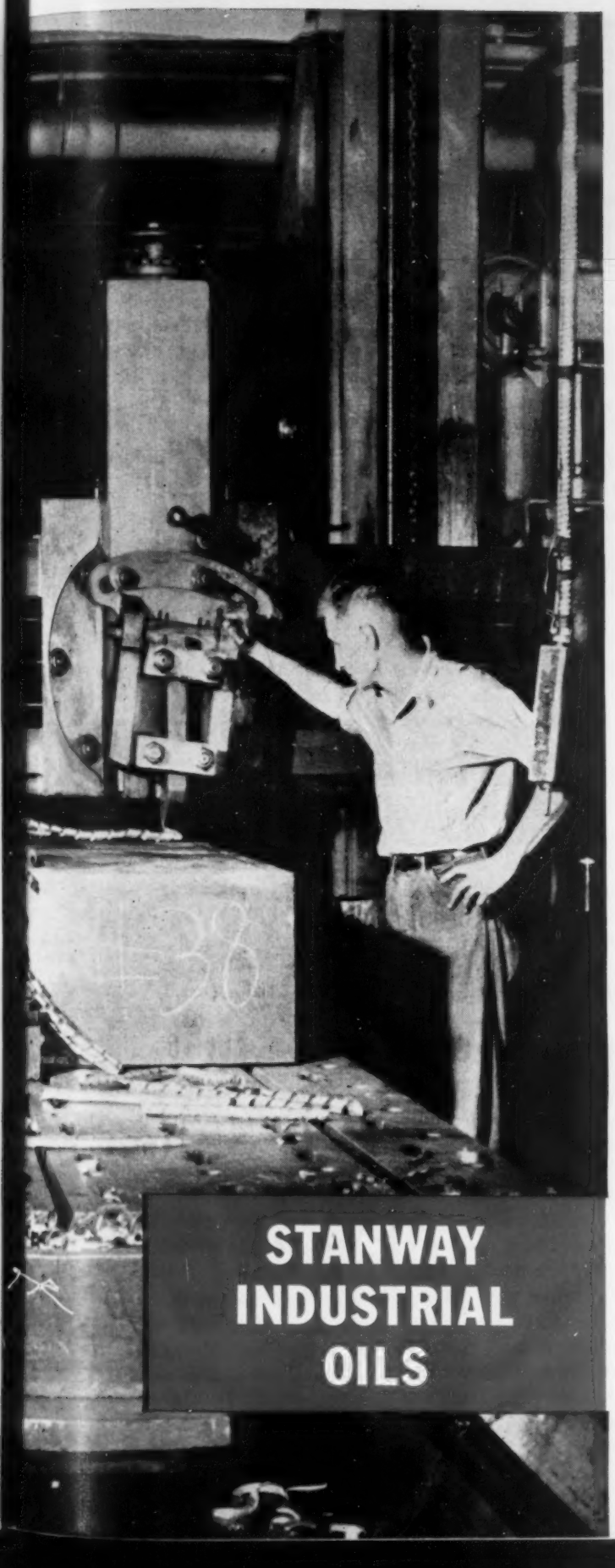
Drives

New bulletin on multiple-generator sectional drives for paper machines has been announced as available from General Electric. Publication points out the flexible versatility of the sectional drives by providing information on installation, operation, maintenance, adaptability and service. *General Electric.*

For free copy circle No. 30 on postcard, p. 97.

How a little talk (with the right person)

The "right person" was E. F. Aschemeyer, at left, Standard Oil lubrication specialist. His practical experience and training helped Elkin solve *their* problem.



stopped a lot of chattering

Chattering and scoring of ways was causing trouble for the Elkin Tool and Manufacturing Company of Detroit. The trouble was noted on a big planer operating under extremely heavy loads. A Standard Oil lubrication specialist recommended the use of STANWAY #95, a very stable oil having extreme oiliness and containing a tackiness agent. Result: smooth operation, complete elimination of chattering and scoring.

STANWAY Industrial Oils were developed to meet the extreme oiliness requirements of certain machine tools which customarily operate under very heavy loads. STANWAY Oils are part of a complete line of industrial oils, cutting oils and coolants that serve all industry.

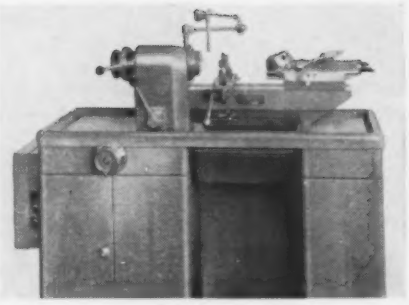
No matter how "special" your problem may be, there's a Standard Oil product to solve it. There's also a near-at-hand Standard Oil lubrication specialist to help you select and apply the right one. To obtain his services call the Standard Oil office nearest you, or write Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.

STANDARD

STANDARD OIL COMPANY
(Indiana)

NEW EQUIPMENT

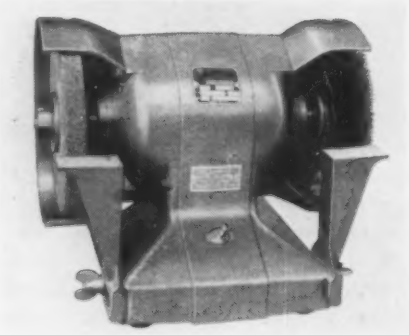
New and improved production ideas, equipment, services and methods described here offer production economies . . . just fill in and mail the postcard on page 97 or 98.



Hand screw machine saves operator's time

A new method of driving the headstock spindle—with a timing belt—is a feature of the Model No. 73 hand screw machine. This transmission drive is said to eliminate many problems common to most drives, and will help in maintaining operating accuracy. Mechanical reverse gives instant reversals without disturbing the continuous forward operation of the motor. Hardened and ground self-centering bed assures balanced precision alignment of all attachments. Top spindle speed is 3500 rpm. Headstock, totally closed, has 1-in. collet capacity. *Wade Tool Co.*

For more data circle No. 31 on postcard, p. 97.



Bench grinder efficient for intermittent shop use

Grinding, tool sharpening, wire brushing and buffing are performed on a new ¼ hp bench grinder. Features of this new 6-in. standard grinder include a spindle mounted on permanent, lubricant-sealed ball bearings and two adjustable tool rests. As grinder wheels become worn, tool rests can be moved closer to the wheels. The grinder weighs 25 lb, is 9 in. high and has an overall spindle length of 12 in. Wheel size is 6 in. diam, with a ⅝-in. face and a ½-in. hole. Motor operates on standard ac single-phase voltages. The grinder is available in 60, 50 or 25 cycles, with 3600, 3000 or 1500 rpm rating. *Black & Decker Mfg. Co.*

For more data circle No. 32 on postcard, p. 97.

Volt-ammeter has automatic scale changing

Pocket-size hook-on volt-ammeter measures current and voltage quickly and accurately. Its automatic scale changing feature eliminates the possibility of reading the wrong scale for the applications. Is a valuable aid in balancing circuits, tracing faults and grounds, estimating distribution circuits, and diagnosing operating troubles. Current range is 5/20/80/350 amperes. Measures ac voltage in 150/300/750 range. Clamps around any conductor up to 2 in. diam. *General Electric Co.*

For more data circle No. 33 on postcard, p. 97.

Low cost machine for dust-free blast cleaning

Vacu-Blast, Jr., gives a uniformly clean surface free of rust, scale or dirt. It thoroughly cleans either rough or smooth areas and will prepare pitted surfaces. For welding operations it gives metal the clean, scale-free finish necessary for high quality, non-porous welds. A surrounding brush with vacuum pickup on the blast gun confines all dirt and abrasive and permits blasting anywhere in shop without interfering with nearby operations. Special cyclone separates dust which is carried off to dust jar while abrasive is collected in the bottom for re-cycling. Entire unit weighs 80 lb, is mounted on casters for easy and quick mobility. Only compressed air is needed to operate the Vacu-Blast Jr. The machine is designed for use with steel grit; may be used effectively with soft types of abrasive. *Vacu-Blast Co., Inc.*

For more data circle No. 34 on postcard, p. 97.

Turn Page

Even the best chef samples the soup

Ever watch a good chef at work?

He doesn't trust to luck — he tastes — samples — *inspects.* He practices his own kind of process control — looking for imperfections while there's still time to correct them, without throwing away his finished product or his time!

There's an example here for many manufacturers. The *earlier* in your production that you can spot defects in parts or materials, the less it costs to salvage or scrap them — and to correct the process that causes the defects.

You might call this kind of process control "correctioneering." Usually it includes nondestructive testing methods by Magnaflux'*. For inspection by Magnaflux lets you know usefulness in advance — finds defects when and as they occur — prevents their recurrence — and avoids waste of processing time, labor and money.

This money-saving use of Magnaflux' methods is practiced by hundreds of efficiently operated companies — making everything from kitchen sinks to parts for guided missiles.

The cost?—Far less than the savings; total is usually under a penny or two per part inspected — with inspection at production speeds, when required.

Why not find out now where "correctioneering" by Magnaflux' methods can save you money — *and how much.* Ask to have a Magnaflux engineer give you the facts.

**Magnaflux is a U. S. registered trade mark of Magnaflux Corporation.*

Write for the informative booklet, "FINDING THE 'WHERE AND HOW' OF LOWER PRODUCTION COSTS." Cites examples, shows you how. FREE upon request on your company letterhead.

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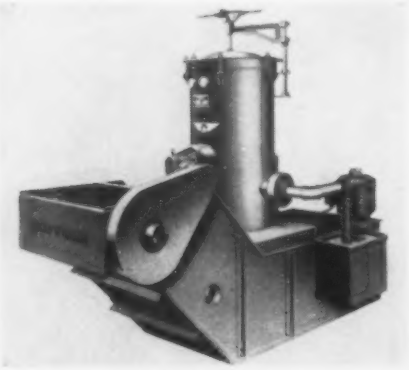


New clarifier restores machining oils

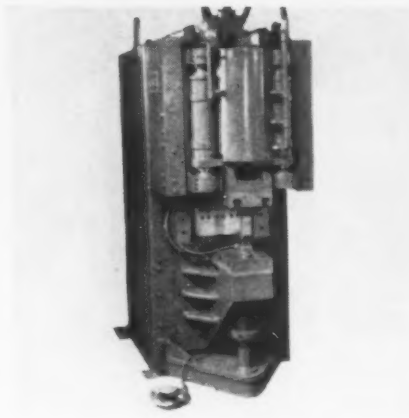
The Magna - Flomaster, a three-phase filtering system, clarifies mineral cutting oils or water soluble coolants used with finishing grinders and other machine tools where ferrous metals are being worked. The contaminated oil first enters a tank where the heavier solids are allowed to settle to the bottom. Next the lighter ferrous particles are attracted to a magnetic plate. The oil finally is passed through a full-flow cartridge type filter which removes the remaining fine particles. Flow rates range from 20 to 40 gpm in three available models. The clarifiers are designed primarily for use where metallic and grit particles are relatively small. *U. S. Hoffman Machinery Corp.*

For more data circle No. 35 on postcard, p. 97.

Shaper suited for tool room, parts production

Prema shapers, available in three sizes, with 10, 11 or 13-in. stroke, are precise tool room machines, ruggedly built for production line use on work within their capacity. Solid cast iron base and one-piece cast iron column make for stability and long productive life. Drive is by V belt from 2 hp motor, fully enclosed in the column, through quick acting friction clutch. Six ram speeds from 30 to 150 strokes per min and six power feeds are provided. Features incorporated in Prema shapers are hardened alloy steel gearing, anti-friction bearings on all shafts, generously proportioned cross slide and ram slide, adjustable stroke while machine is operating, swiveling tool head. *Austin Industrial Corp.*

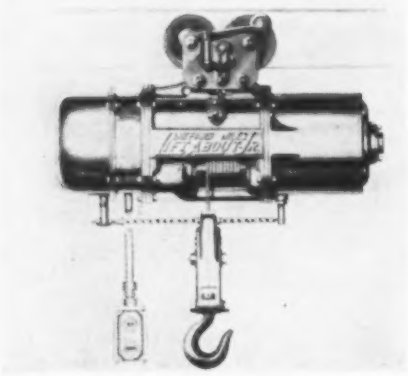
For more data circle No. 36 on postcard, p. 97.



Projection welder features special ram design

New projection welder that combines high welding pressure with fast ram action is suited to the welding of light metals and to other applications requiring high pressures and quick follow-up. The machines are rated at from 5000 to 18,000 psi over a size range of 250 to 500 kva. Ram design combines low inertia with virtually frictionless motion. The ram, equipped with a double-acting pressure head of the zero-friction diaphragm type is mounted in an aluminum frame. The latter is guided on two round-column vertical shafts by sleeves incorporating multiple linear ball bearings. Units have welding strokes over a ½ to 2-in. range and may be had with an adjustable retraction stroke ram providing 3- to 6-in. additional travel. *Universal Welder Corp.*

For more data circle No. 37 on postcard, p. 97.



Wire rope hoist designed for intermittent duty

A light service, quick action wire rope type hoist, known as the Lift About-Jr., is available in ¼ to 1 ton capacities and comes with ac or dc motor. It can be supplied with collectors for regular conductor systems or with a tag line. It is furnished either parallel or cross mounted, with bolt, hook or trolley suspension. Speeds range from 12 to 25 fpm on dc operated types and 20 to 37 fpm on ac units. Maximum lift is 16 ft on hook suspension units, 20 ft on all other frame sizes. Hoists may be pushbutton or rope operation. Lift About-Jr. employs a combined electric brake and control. Two magnets and contact sets are used, one for hoisting and one for lowering. *Shepard Niles Crane & Hoist Corp.*

For more data circle No. 38 on postcard, p. 97.

Turn to Page 108

right men

right equipment

STEEL CASTINGS

foundrymen add immeasurably to the high quality of CIRCLE Ⓛ engineered products. These workers are craftsmen in every sense of the word, men trained and highly skilled, men dedicated to doing all they can to make your castings *right.*

If the pictures on these pages could talk they'd say, "Here's where equipment and craftsmen make Lebanon CIRCLE Ⓛ castings to a *high standard*—not to a price!" We believe sincerely that there is no economy in buying just by price . . . it is far better to buy the best product at a reasonable cost.

LEBANON STEEL FOUNDRY • LEBANON, PA.

*Special processes acquired from George Fischer, Ltd., of Switzerland. Lebanon Steel Foundry was also the original licensee for the centrifugal casting process developed by Firth-Vickers Stainless Steels, Ltd., Sheffield, England.

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58 Lehman St., Lebanon, Pa.

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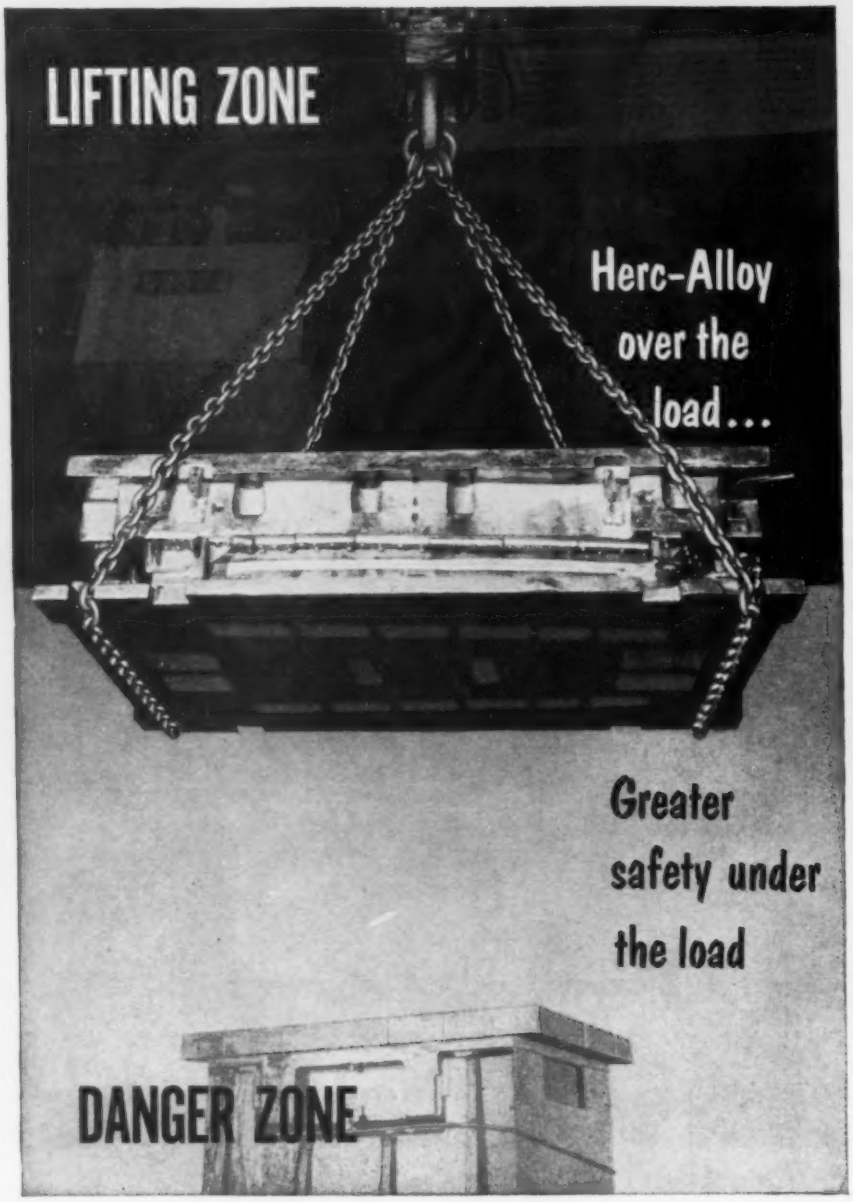
This handy slide chart gives you the nominal analyses, various designations, minimum mechanical properties and heat treatment for 19 Lebanon carbon and low alloy grades and 17 stainless and corrosion-resistant grades. Send coupon today . . .



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SPECIFY
HERC-ALLOY
SLING CHAINS

Write for Data Book

HERC-ALLOY ...is the original alloy steel chain

Herc-Alloy Sling Chains bring you many advantages. First and foremost...they offer maximum protection to men and materials. Secondly, their special alloy steel, processed by men with unmatched heat treatment know-how, gives long life and economy. Third, they weigh less (without any sacrifice in tensile strength) and are far easier for workmen to handle. That's why so many well-known plants are switching to Herc-Alloy Sling Chains.

CM HOISTS AND CHAIN

COLUMBUS McKINNON
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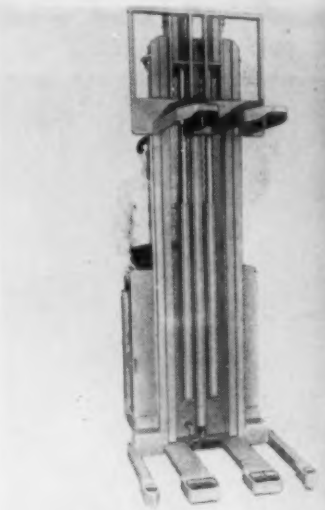
Narrow aisle truck

A new model narrow aisle electric fork truck for warehouse operations is a modified straddle truck with four base legs. Five x 2-in. load wheels straddle the pallet while the 7 in. wide elevating forks lower over another set of base legs with dual 5 x 2-in. wheels. This arrangement is said to provide

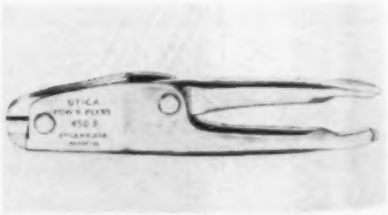


maximum stability at elevated heights up to 158 in. and insures against excessive wheel and floor wear. The truck can right angle stack pallet loads from aisles 6 ft wide, reducing waste storage space to a minimum. The truck is for use with skids, open face or 4-way entry block type pallet where high lifts are required. *Raymond Corp.*

For more data circle No. 39 on postcard, p. 97.

Cuts drill rod

Cam action, high leverage cutting pliers, only 9 in. long, cuts up to 1/8 in. hardened steel drill rod. It fits handily in a workman's pocket.

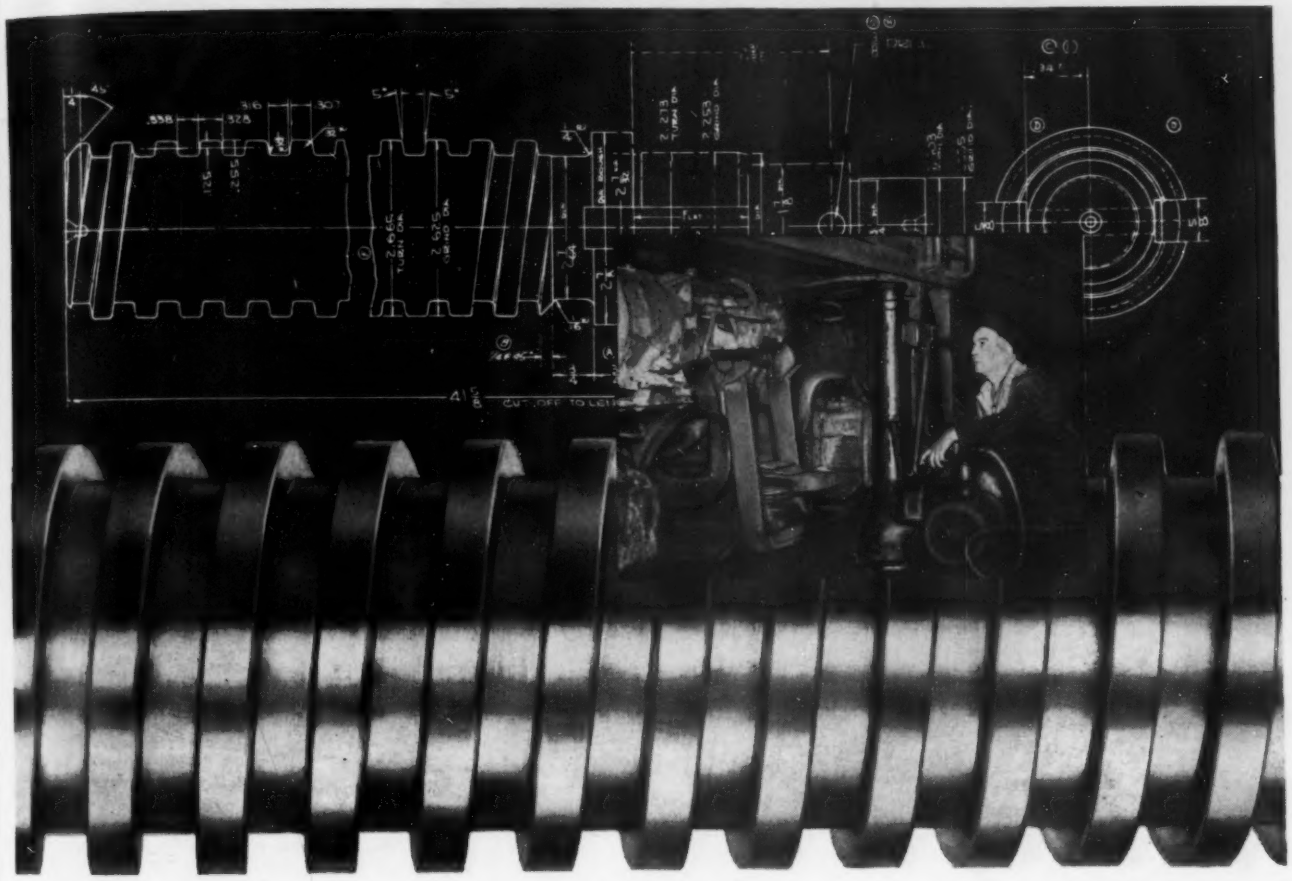


Jaws of the new 450-9 are forged, extra hardened and hand honed. Handles are pressed steel. *Utica Drop Forge & Tool Corp.*

For more data circle No. 40 on postcard, p. 97.

Turn Page

MAX-EL alloy steel part for 100-ton jack



The Max-el part shown above is the lifting screw from a Duff-Norton air motor screw jack. It's the part that actually lifts and holds the load . . . up to 100 tons.

To make the part, blanks are cut from Max-el 3½ bar stock. After heat treating to 321-341 Brinell, threads are chased and all machining performed. Max-el's optimum machinability after heat treatment, its high-strength, toughness, deep hardenability — which prevents thread sinkage, and high surface finish make it an ideal choice for this rugged application.

But try Max-el yourself. Its excellent machinability means longer tool life, more pieces per grind. And you'll appreciate its freedom from distortion and superior quality. For immediate delivery of Max-el call your nearest Crucible representative.

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking **ALLOY STEELS**

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

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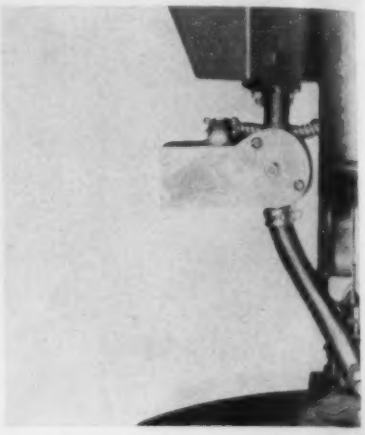
—New Equipment—

Continued

Automatic flux valve

Positive control of the flow of flux on automatic, submerged arc welding applications is claimed for a new type automatic flux valve. The valve operates with all Type LAF-2 automatic welding heads. When the operator turns the Inch-Down

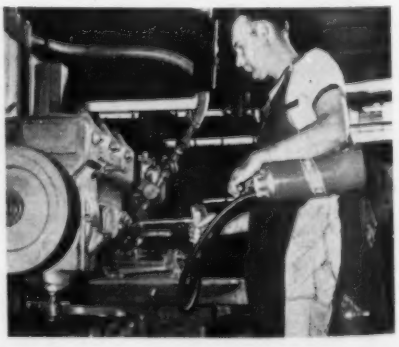


switch to weld position, the flux automatically begins to flow after the electrode contacts the work. The flux flow automatically stops when the Inch-Down switch is reversed. Compact design enables the valve to be attached directly under the flux hopper. *C. B. Herrick Mfg. Corp.*

For more data circle No. 41 on postcard, p. 97.

Air primed lubricator

Portable lubricator, called Aro-Pak, enables the operator to use air power instead of muscle in lubricating complicated machinery or hard-to-reach fittings. User can



lubricate fittings with simple one-hand operation. A hand pump primes the unit with air pressure in a minute. Unit weighs 15 lb filled. *Aro Equipment Corp.*

For more data circle No. 42 on postcard, p. 97.

Turn Page

Case History IA-110

Here's what we mean by *SUPERIOR* ENGINEERED FOUNDRY PRODUCTS...

PROBLEM:

1. As originally designed, this clevis lacked eye-appeal, detracting from the appearance of the finished product of which it was a component part.
2. The fact that twelve pieces were required for each complete unit caused excessive handling, machining and assembling, made the part expensive to produce.
3. Because of its design and shape, the unit frequently failed to function properly.
4. Weight of unit, 3 lbs. 11 ozs.

SOLUTION:

A SUPERIOR FOUNDRY ENGINEERED DESIGN one-piece malleable iron casting.

RESULT: 45.9% SAVINGS

1. Smooth, flowing lines of re-designed clevis improved appearance of customer's finished product.
2. Redesigned clevis resulted in lower production cost per unit — only five pieces per unit required. Holes for pulley axle were cored.
3. Smooth shape of clevis permitted part to function properly at all times, improved performance of finished product.
4. A weight reduction of 1 lb. 7 oz. for complete unit.

TOTAL COST OF PART REDUCED 45.9%

You, too, can get advantages like these! Consult our PRODUCT DEVELOPMENT SECTION regarding your problem while it's still on the drawing board. Remember... correct design benefits both you and the foundry, regardless of size of casting.

SALES OFFICES: CHICAGO 4, Railroad & Industrial Products Co., 332 S. Michigan Ave.
DETROIT 35, 18050 James Couzens Highway
BUFFALO 21, Gibney-Coffman Corp., 2107 Kensington Ave.

ENGINEERED FOUNDRY PRODUCTS

SUPERIOR STEEL AND MALLEABLE CASTINGS CO

BENTON HARBOR, MICHIGAN, U.S.A. | Making Good Castings for Quality-Conscious People Since 1916

One of our closure clients was on the brink of ruin not too long ago. A competitor of his was introducing a new cap, made in a new way, of a new material. It cost so much less to produce that our client couldn't compete. Something had to be done fast if he was to save his business.

Fortunately it was. He brought his problem to Taft-Peirce. Asked if there were some way we might improve his production process to make it competitive again.

Taft-Peirce engineers analyzed the problem, combined several costly hand operations into one automatic machine . . . then designed and built it.

Today, several of these machines are helping this manufacturer to maintain his share of the market.

Perhaps you have a problem that Taft-Peirce experience and facilities can help you solve. For a complete picture of the many services Taft-Peirce renders to industry, write for 92 page illustrated booklet, "Take It To Taft-Peirce".

For Engineering, Tooling, Contract Manufacturing

TAKE IT TO TAFT-PEIRCE

The Taft-Peirce Manufacturing Company, Woonsocket, R. I.

TELEPHONE: WOONSOCKET 1.

—New Equipment—

Continued

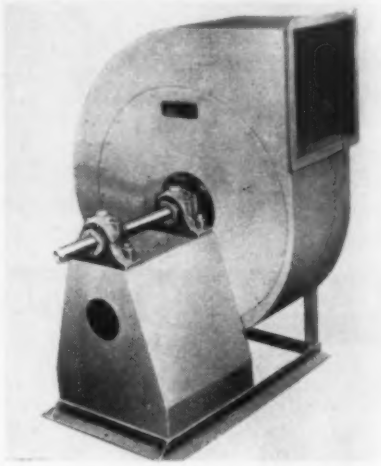
Salvaged diamonds

Diamond grinding wheels are available on normal delivery schedules in many standard sizes. And customers can send grinding swarf to a swarf reclaiming department and be credited with the diamonds which are salvaged. Wheel stubs are also salvaged. *Norton Co.*

For more data circle No. 43 on postcard, p. 97.

Exhaust blowers

Two lines of exhaust blowers comprise a compact, self-contained coated exhaust fan set designed for services ranging from simple ventilating to handling of moderately corrosive atmospheres. Blower capacities are from 300 to 7000 cfm.



For service with corrosive elements, units are supplied with either baked phenolic, vinyl or tough latex coatings. A line of heavy-duty rubber covered blowers for rugged service in severe corrosive or abrasive conditions is available in blower capacities from 750 to 54,000 cfm. *Heil Process Equipment Corp.*

For more data circle No. 44 on postcard, p. 97.

Snap gage master

Adjustable set master for setting the Boice dial snap gage can be preset with gage blocks, then locked in position and sealed. It is then a production tool to be used at the machine or the inspection bench as both the master and gage holder. The master can be easily and quickly changed from one dimension to another. *Boice Mfg. Co., Inc.*

For more data circle No. 45 on postcard, p. 97.

The Iron Age

SALUTES

Max Jaenchen

Original metalworking designs and musical accomplishments have marked his busy career in two countries.

ABOUT the only metalworking product Max Jaenchen doesn't like is the saxaphone—he hatés popular music. In music his tastes are classical, especially Mozart and Wagner; as chief consulting engineer of Mannesmann-Meer Engineering & Construction Co., Easton, Pa., he stresses the most up-to-the-minute developments in metal fabrication. And he's responsible for many of them.

Max was out of a job when he landed in this country after 16 years of metalworking in Germany. There, his professional career had begun with the famous Mannesmann Tube Works, one of the parent companies of his present firm. Here, he started with Youngstown Sheet & Tube.

Shortly he was a design engineer with Standard Engineering Co. (later Aetna-Standard Engineering). During the 26 years he spent there Max became well known to the seamless tube industry for his outstanding design contributions in steel, copper and brass fabrication. Many of his designs were firsts in the industry.

When Mannesmann-Meer came to this country, it was only fitting for the company to chose its employee of three decades ago, Max Jaenchen, to supervise mill machinery installations, including mechanical extrusion presses for seamless steel tubing.

In addition to his music, Max writes poetry and philosophy. A wide range of interests seems to run in the family: One of his daughters is a Boston doctor, the other has sung opera in Philadelphia. His four grandchildren are concentrating on the wood and brass toys Max makes for them.

This new locomotive cut fuel bills

...with the help of TIMKEN® bearings

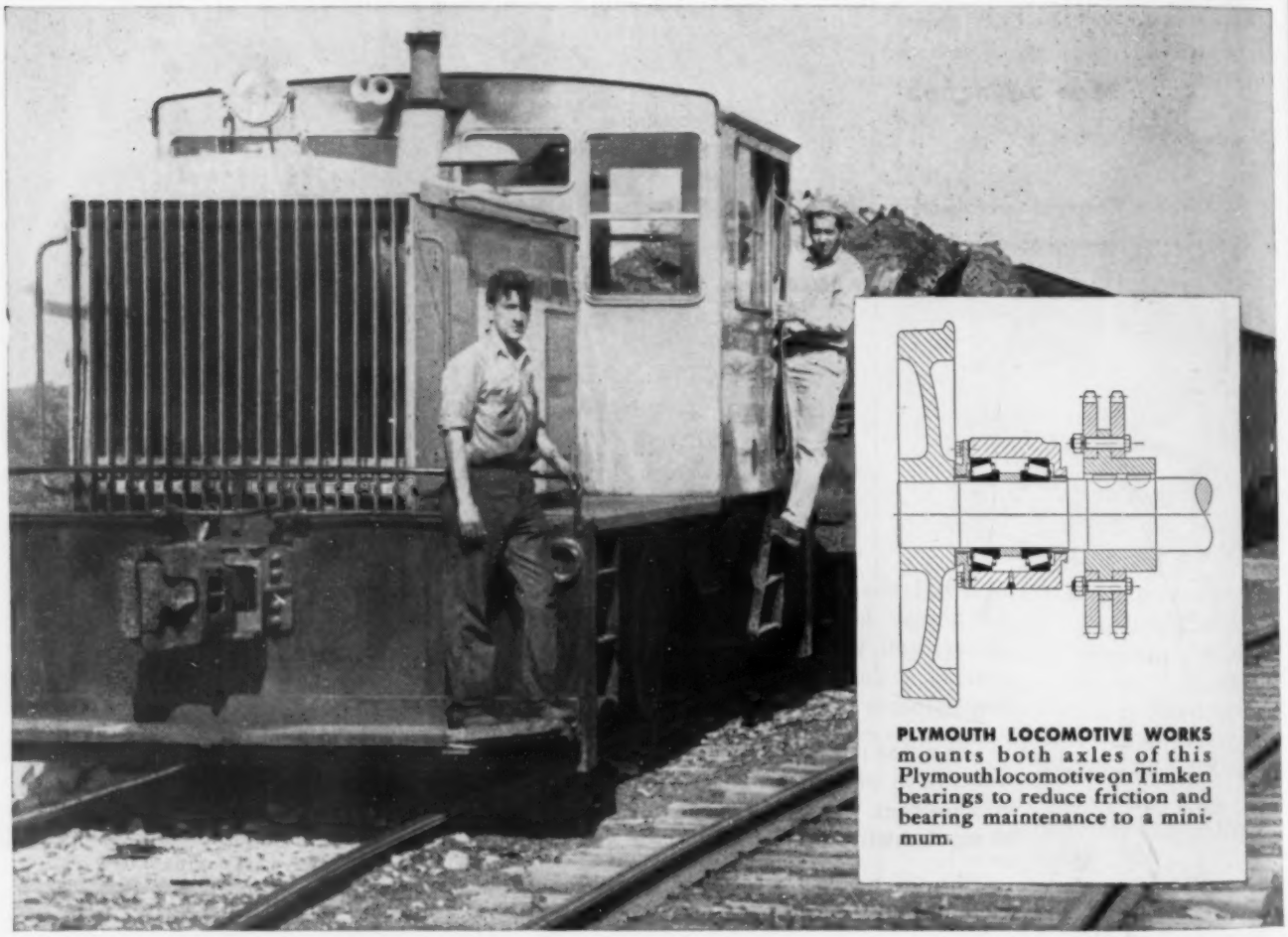
THIS new Plymouth locomotive replaced a tired old locomotive of the same size at the Pittsburgh Ferrous Products Co. It runs over a month on the fuel the old one burned up in ONE week.

Timken® tapered roller bearings on both axles helped make the record possible because they cut friction to a minimum. Used as yard engines, these locomotives are constantly starting and stopping—a chief cause of fuel consumption. But Timken bearings reduce starting resistance 88% as compared with friction bearings. They *roll* the load; they don't slide it. The locomotive starts easily, uses less fuel.

Maintenance on Timken bearings is exceptionally low as compared with friction bearings. There's no constant lid-lifting and waste repacking. The hot box problem is eliminated and bearings last longer.

Timken bearings are a sure sign of quality on any piece of equipment you build or buy. Look for the trademark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



PLYMOUTH LOCOMOTIVE WORKS mounts both axles of this Plymouth locomotive on Timken bearings to reduce friction and bearing maintenance to a minimum.

FINISHED TO CLOSER TOLERANCES

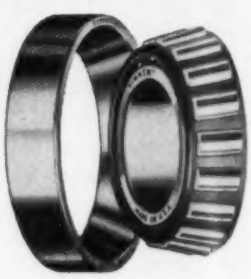
Finishing to incredible smoothness accounts for much of the precise, smooth rolling performance of Timken bearings. This honing operation is typical of the amazingly accurate manufacturing methods at the Timken Company.

The Timken Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST ▯ LOADS OR ANY COMBINATION ✳

The Iron Age

INTRODUCES

Christian **F. Beukema,** appointed vice-president, Michigan Limestone, Div., U. S. STEEL CORP., Detroit.

Harold **S. Geneen,** elected vice-president, and controller, JONES & LAUGHLIN STEEL CORP., Pittsburgh; and **A. A. Archibald,** becomes vice-president—Special Products and Services.

Robert **E. Harvey,** elected executive vice-president and general manager, NEWPORT STEEL CORP., Newport, Ky.; **Rolland O. Baum,** elected vice-president; and **D. M. Pope,** becomes comptroller.

Ralph **Winslow,** appointed departmental vice-president, KOPPERS CO., INC.

Edward **A. Livingstone,** vice-president, elected to the board of directors, THE BABCOCK & WILCOX CO., New York.

Edwin **C. McCleary,** appointed vice-president, in charge of manufacturing, WILLYS MOTORS, INC., Toledo.

Robert **S. Grover,** elected executive vice-president, APEX STEEL CORP.

J. **A. Lane,** appointed assistant to the vice-president, WHEELING CORRUGATING CO., Wheeling, W. Va.; A. **F. Stewart,** appointed manager, Market Research & Sales Analysis Div.

Norman **F. Gebauer,** appointed director of newly formed industrial sales district KEYSTONE STEEL & WIRE CO., Peoria, Ill.; and **Smith T. Randol** and **Ronald H. Clifton** promoted to field sales positions.

Dean **E. Wooldridge** and **Simon Ramo,** elected to the board of directors, THOMPSON PRODUCTS, INC., Cleveland.

Roy C. Andrews, appointed assistant to director of industrial relations and personnel, LACLEDE-CHRISTY CO., St. Louis, Mo.

Russell J. O'Neil, appointed field engineer, NORTON CO., Worcester, Mass.

Charles W. Harrison, appointed district sales engineer, Houston, Tex., THE INGALLS IRON WORKS CO. and its subsidiaries, The Ingalls Shipbuilding Corp. and the Ingalls Steel Construction Co.

A. E. Nussbaum, appointed engineering consultant, Rolling Mill Div., STANAT MFG. CO., Long Island City, N. Y.

John R. Robertson, appointed manager, Engineering Administration Dept., CHRYSLER CORP., Central Engineering Div.

Erhart K. Drechsel, joins Market Research Dept., AMERICAN CYANAMID CO., New York.

Fred J. Watt, named manager, Air Conditioning and Refrigeration Div., WORTHINGTON CORP., Harrison, N. J.

Charles F. McCabe and **Joseph H. Famme,** appointed assistant chief engineers San Diego Div., CONSOLIDATED VULTEE AIRCRAFT CORP.

Charles W. Ledig, appointed sales manager, Industrial Actuators & Controls Div., NATIONAL PNEUMATIC CO., INC.

Clifford T. Olsen, appointed service engineer, ACHESON COLLOIDS CO., Port Huron, Mich.

John W. Judson, appointed systems and procedures analyst, ELECTRIC REGULATOR CORP., Norwalk, Conn.

J. F. SCHIRTZINGER, appointed president and general manager, Consolidated Tool & Products Co., Los Angeles.

FREDERICK J. MAYO, appointed executive vice-president, F. H. McGraw & Co., New York.

HAL P. KIBBEY, appointed assistant vice-president-sales, U. S. Steel Supply Div., U. S. Steel Corp.

Personnel

Scott H. Hanville, Jr., becomes manager of technical sales, JACK & HEINTZ, Cleveland.

John B. Lang, becomes sales engineer, Sound Equipment Div., AMPEX CORP.

M. C. Peterson, named automotive sales manager, WARNER ELECTRIC BRAKE & CLUTCH CO., Beloit, Wis.

James P. Kane, appointed to the southern territory, MELDON STEEL CO., Brooklyn, N. Y.; **Donald T. Burtch**, appointed to northern territory; **George E. Compton**, appointed to the Syracuse-Auburn district; and **Jerome Giambra**, appointed general sales manager, Syracuse Warehouse.

J. A. Dickson, appointed Southeastern district manager, Steel Strapping Div., Atlanta, Ga. headquarters, THE STANLEY WORKS, New Britain, Conn.

Earl F. Warner, appointed works manager, El Segundo, Calif., plant, Nash Motors Div., NASH-KELVINATOR CORP.

M. C. Peterson, named automotive sales manager, WARNER ELECTRIC BRAKE & CLUTCH CO., Beloit, Wis.

Todd W. Fredericks, appointed Detroit district manager, Original Equipt. Div., ALUMINUM INDUSTRIES, INC., Cincinnati.

Edwin R. Campbell, named southern manager, Electro Dynamic Motor & Generator Div., GENERAL DYNAMICS CORP.

Glenn Lechleitner, promoted to general manager, THE CLEVELAND PUNCH & SHEAR WORKS CO., Cleveland.

Edward R. Bate, appointed sales manager, CRATEX MFG. CO., San Francisco.

R. B. Young, appointed plant superintendent, Sorel operation, QUEBEC IRON & TITANIUM CORP., Montreal, Canada.

Paul B. Kluthe, becomes sales representative, new Denver, Colo. sales office, KAISER STEEL CORP.

ALLEN W. WALZ, promoted to director of employee relations, Arma Corp.

WILLIAM A. COOK, elected treasurer, Phoenix Iron & Steel Co., and Phoenix Bridge Co., subsidiaries of Barium Steel Corp.

G. A. PROFITA, named regional manager, Manufacturing Dept., Boiler Div., The Babcock & Wilcox Co.

RUSSELL J. O'NEIL, appointed field engineer, Norton Co., Worcester, Mass.

NEW!

BART LECTRO-CLAD NICKEL-PLATED Steel Plated and Sheet

for fabricating into products demanding corrosion and contamination control.

Nickel plated on either or both sides by the electro deposition of pure nickel which provides a permanently bonded, ductile and pore-free cladding up to .020" thick. Produced with a new plating technique developed by BART MANUFACTURING CORPORATION and now available in sizes up to 7 feet x 20 feet.

★ LECTRO-CLAD Plate and Sheet suitable for fabrication into all types of storage tanks, chemical processing vessels and other equipment and installations where corrosion or contamination problems exist.

★ THICKNESS OF CLADDING can be supplied to particular requirements and not necessarily governed by the thickness of the steel plate over which it is applied.

★ ALL RELATED WELDING techniques perfected. No special equipment required.

★ LECTRO-CLAD Plates and Sheets withstand heating, forming, bending and other fabricating processes without change.

Write to Dept. 1A-4 for details.

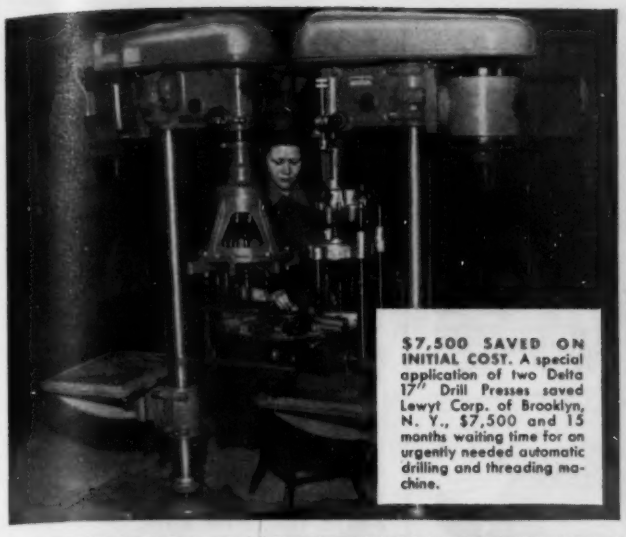
LECTRO-CLAD PLATE is the direct outgrowth of the successful patented BART PROCESS for nickel-lining of seamless steel pipe and fittings.

BART LECTRO-CLAD

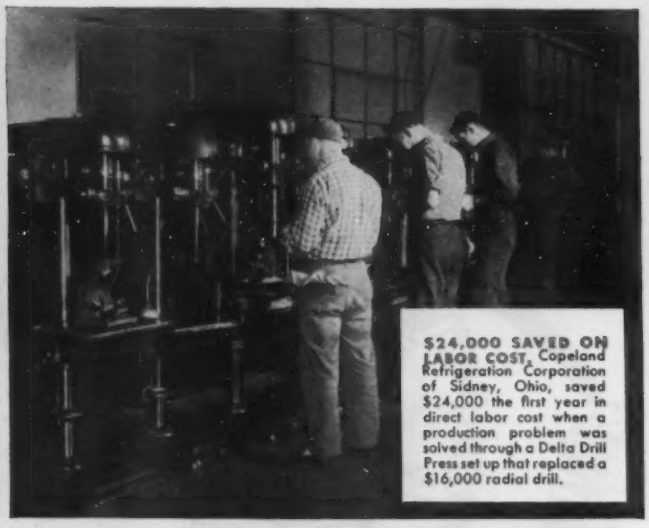
BART MANUFACTURING CORPORATION

229 Main Street • Belleville 9, New Jersey

Exclusive territories available to qualified distribution organizations

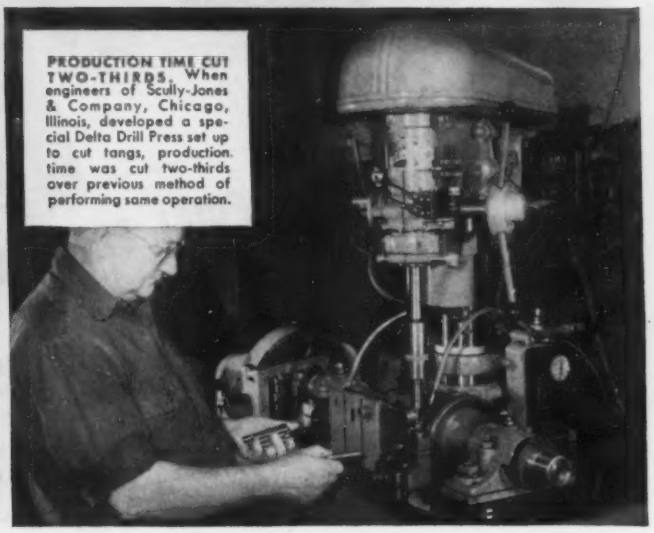


$7,500 SAVED ON INITIAL COST. A special application of two Delta 17" Drill Presses saved Lewyt Corp. of Brooklyn, N. Y., $7,500 and 15 months waiting time for an urgently needed automatic drilling and threading machine.



$24,000 SAVED ON LABOR COST. Copeland Refrigeration Corporation of Sidney, Ohio, saved $24,000 the first year in direct labor cost when a production problem was solved through a Delta Drill Press set up that replaced a $16,000 radial drill.

MATERIAL HANDLING COSTS SLASHED. Sangamo Electric Company, Springfield, Illinois, eliminated costly trucking and handling through use of Delta sectional table drill press set ups, with operator moving from one machine to another.



PRODUCTION TIME CUT TWO-THIRDS. When engineers of Scully-Jones & Company, Chicago, Illinois, developed a special Delta Drill Press set up to cut tangs, production time was cut two-thirds over previous method of performing same operation.

Four Basic Problems: ONE SENSIBLE ANSWER

(Rockwell-built DELTA Power Tools can be your answer to rising costs, too!)

If your profits are being squeezed between rising costs and stiffening competition, do what other progressive businessmen are doing. Use low-cost Delta Power Tools to supplement—and sometimes replace—heavy, expensive conventional machine tools.

Rockwell-built Delta Power Tools make possible big savings in labor, time, and material handling costs because they are so easy to move into and out of production lines, and set up in special combinations. They work to extremely close tolerances, and *stay* accurate, require a minimum of maintenance. Parts are quickly available. And Delta Power Tools are so inexpensive that they make money for their owners *even when standing idle.* They can be *kept* tooled up, saving costly set-up time.

The growing trend toward low-cost, portable, accurate Delta Power Tools amounts to virtually a "new industrial revolution"—a new kind of production thinking that is cutting costs in plant after plant. Your Delta dealer can help you cut *your* costs, too—he's listed in the classified pages of your phone book under "TOOLS" or "MACHINERY." *Delta Power Tool Division, Rockwell Manufacturing Company, 640D N. Lexington Ave., Pittsburgh 8, Pa.*

DELTA MILWAUKEE **DELTA QUALITY MAKES THE DIFFERENCE**

ROCKWELL

DELTA QUALITY POWER TOOLS

Another Product by **Rockwell**

Delta Power Tool Division
Rockwell Manufacturing Company
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☐ Please send me full information about Delta Power Tools, including Catalog AB-53.

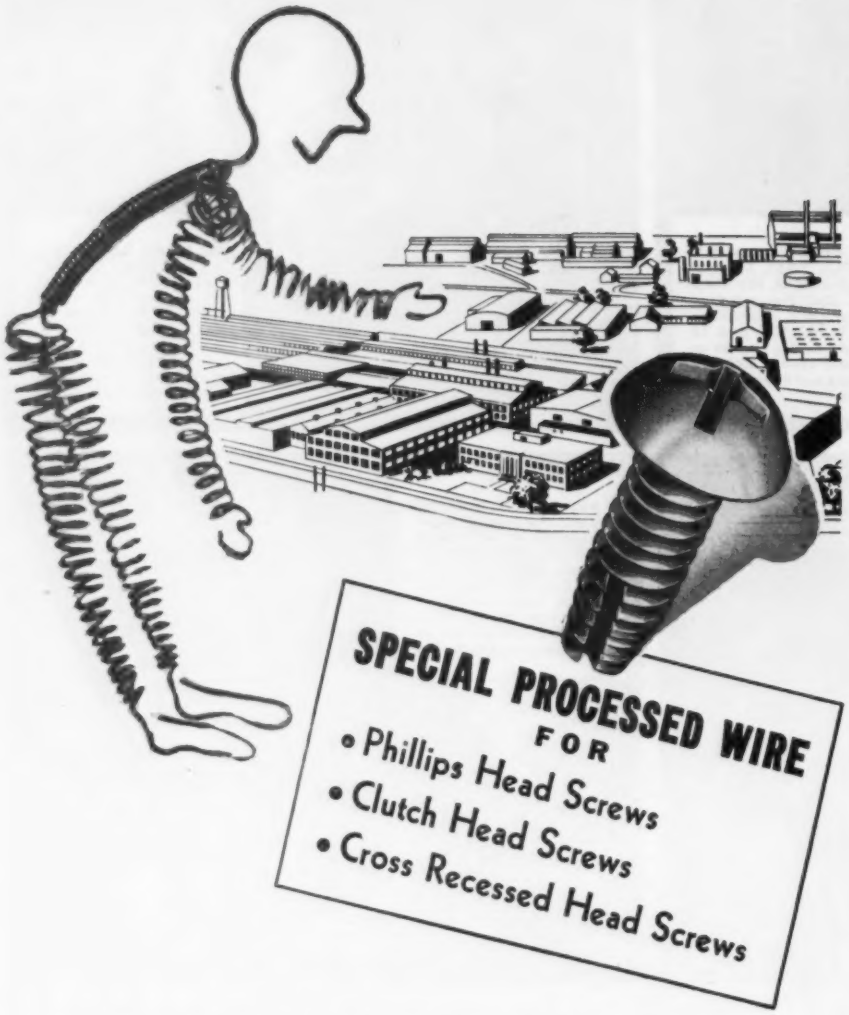
☐ Please send me the name of my nearest Delta dealer.

Name_____

Company_____ Title_____

Address_____

City_____ Zone____ State_____



PRODUCTION CAPACITY DOUBLED

To keep pace with the rapid increase in the use of recessed head screws, Keystone is doubling its capacity in the manufacture of "Special Processed" wire.

The unusual qualities of Special Processed Wire are recognized by licensed manufacturers of recessed head screws. This wire has also proved itself superior on many other difficult cold heading jobs.

Our additional capacity will enable us to meet the ever-increasing demand for "Special Processed" wire by our present customers and at the same time welcome new customers.

Keystone Steel & Wire Company
PEORIA 7, ILLINOIS

—Personnel—

Joseph S. McCulloch, appointed manufacturer's representative, Corrosion Engineering Products Dept., PENNSYLVANIA SALT MFG. CO., Philadelphia.

W. W. Beadle, appointed superintendent of production, CHRYSLER CORP., Detroit; and **E. J. Weiss,** appointed plant engineer, Chrysler Jet Engine Plant.

John R. Gregory, appointed Pacific Coast sales representative, National Bearing Div., AMERICAN BRAKE SHOE CO., New York.

Holland A. Draper, named chief accountant, Vesta - Shannopin Coal Div., JONES & LAUGHLIN STEEL CORP. He succeeds Thomas I. Shearin, who has retired.

R. S. Skinner, appointed sales representative, Philadelphia, Spang-Chalfant Div., NATIONAL SUPPLY CO.

Reinout P. Kroon, named director of research, Aviation Gas Turbine Div., WESTINGHOUSE ELECTRIC CORP.

OBITUARIES

Karl M. Leute, president, Lithium Corp. of America, Inc., and also president of Manganese Chemicals Corp., Minneapolis, recently.

Charles C. Bigelow, late president, City Auto Stamping Co. and City Machine & Tool Co., Toledo, suddenly.

Henry Duckworth, 82, retired vice-president, Norton Co., Worcester, Mass. He had worked for Norton for more than 60 years.

Pierre S. du Pont, 84, industrialist, philanthropist, director and honorary chairman of the board, E. I. du Pont de Nemours & Co., unexpectedly in Memorial Hospital, Wilmington, Del.

Clifford F. Hutchings, New York district manager, Shepard Niles Crane & Hoist Corp.

Arthur C. Mengel, chief chemical engineer, American Locomotive Co., Schenectady, N. Y., suddenly of a heart attack recently.

Brush, dip or spray—

The Iron Age
FOUNDED 1855

New Low-Cost Coating Gives Mild Steel Good Corrosion Resistance

By G. J. Harvey
Asst. Technical Director
New York Testing Laboratories, Inc.
New York

◆ Fast, low-cost application of a nickel-phosphorus coating is claimed to give mild steel corrosion-resistant properties comparable to some stainless steels . . . Application can be by brushing, dipping or spraying . . . An oxide of nickel is reduced on the coated surface at a temperature much lower than that of either the base metal or nickel.

◆ Basic ingredients of the mixture are inexpensive . . . Nickel oxide, dibasic ammonium phosphate and water are combined to paste, paint or spray consistency . . . One pound of raw material coats about 25 sq ft to a thickness of 0.001 in. . . . Any thickness can be applied to all shapes and sizes of objects.

◆ ANY THICKNESS of a high-nickel low-phosphorus alloy can be coated on vessels and piping of all shapes and sizes. In this process, which was recently developed by New York Testing Laboratories, Inc., New York, an oxide of nickel is reduced on the surface to be coated, and at a much lower temperature than the melting point of either the base metal or elemental nickel. The method, called the Niphos process, is fast and practical. It is relatively simple to apply and requires little skill.

A combination of nickel oxide (preferably green), dibasic ammonium phosphate and water is made to paste, paint or spray consistency. The ratio of the nickel oxide to ammonium phosphate may vary from 2:1 to 20:1, depending on the firing temperature. The higher the ratio of phosphorus carrier to nickel oxide in the initial mixture, the lower the temperature needed to reduce, fuse, and alloy bond the coating on the base metal.

By varying the constituents, the resulting alloy will vary in percentage of phosphorus. It will also vary the physical properties of the coating. Another effect is that the coating will fuse and flow more readily in the firing operation with the higher percentage of phosphorus. Equipment for firing or reduction plating is about the same as standard furnace equipment. Complete atmosphere control must be maintained throughout the firing process. The most successful reducing atmosphere is pure hydrogen although other reducing gases may work satisfactorily.

Any atmosphere containing carbon molecules in its makeup has a detrimental effect on the coating. Moreover, carbon in any form except as an alloy with steel, can prevent a successful

Success of the protective coating depends on its continuity . . .

product. Therefore, contact with oily contaminants must be avoided during all operations and degreasing before coating is necessary.

The firing temperature ranges from 1600° to 2000°F, depending on the initial proportions of nickel and phosphorus carriers. By combining phosphorus with nickel in small percentages, the melting point of nickel is reduced from 2642°F to the relatively low range of 1600°F. In this range, there is little adverse effect on most ferrous metals. It is also the general normalizing temperature for most steels.

Firing time need only be as long as it takes to get a skin heat up to the required temperature. It is this advantage which permits extremely heavy coatings to be applied quickly and cheaply.

By microscopic examination, the coating shows a strong bonding and alloying with the base metal. The coating is relatively free from porosity. It appears that a ternary alloy forms at the interface of the base metal and coating. This iron-nickel-phosphorus alloy imparts to the coating the ductile properties of the base metal, yet the coating lends a hard surface to the object. It is therefore possible to bend a coated piece 180° without peeling or flaking. Hardness of the coating ranges from 38 to 42 Rc.

Resists dilute nitric acid

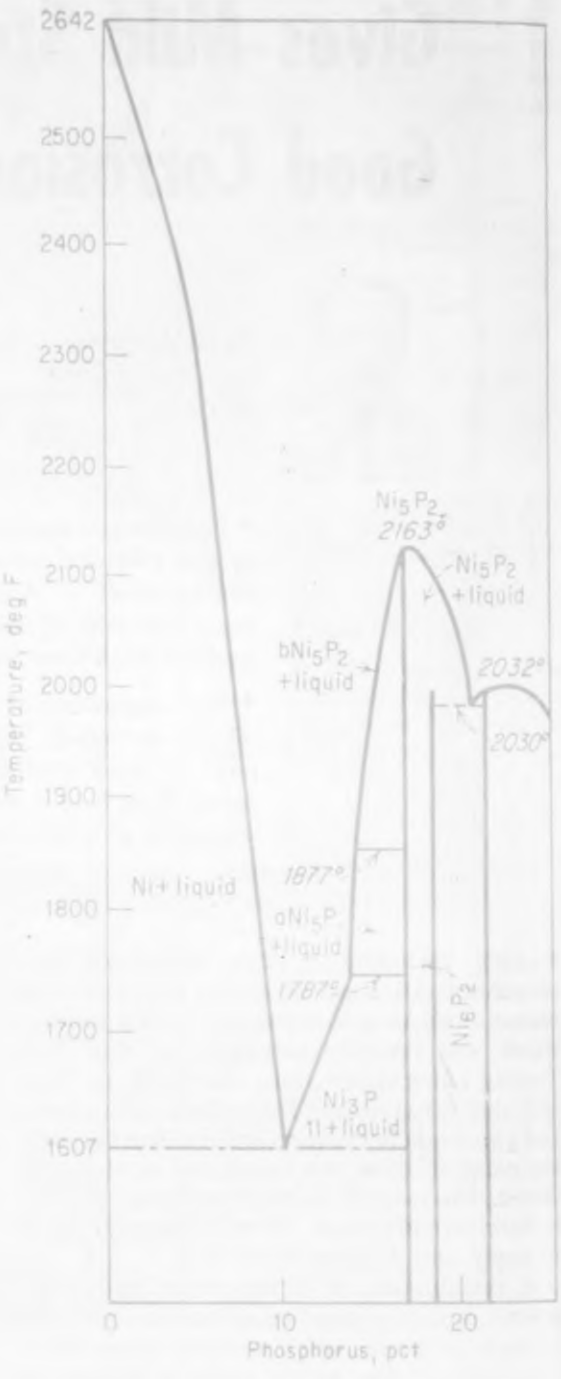
Compared to most commonly used metals, nickel has extremely good corrosion resistance. In combination with small percentages of phosphorus, nickel is even more corrosion resistant. With relatively thin coats of the new coating, objects have resisted salt-spray corrosion as long as 100 hr. Coated steel specimens have retained their polished luster after 10 years of exposure to normal atmospheric conditions.

The new coating also offers excellent resistance to hot solutions of dilute nitric acid at room temperature. It has fair resistance to dilute nitric acid at room temperature.

The success with which the coating withstands and protects the base metal depends largely upon its continuity. Porosity, the main problem with most platings, can be reduced to a minimum by the Niphos process. This is done by varying the technique. Higher ratios of phosphorus carrier to the nickel oxide in the original painting-on mixture produces more porosity. Therefore, a mixture must be sought in each case which will give satisfactory coverage, yet maintain minimum porosity. Another method is to dry the unfired coating in an oven at 180°F. This prevents minute gas pockets from forming during the firing operation.

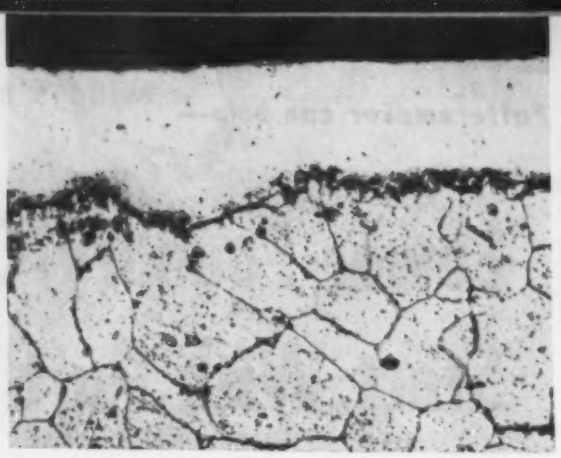
Reactions occur in two main presentations. In the first reaction, diammonium phosphate reacts with the nickelous oxide and the hydrogen of the reducing gas to produce an alloy of nickel and phosphorus which contains about 10 pct phosphorus. This is the eutectic alloy of nickel and phosphorus. Other products which result from the reaction are ammonia, water vapor and phosphine.

In the second reaction, the phosphine reacts with some of the nickelous oxide to produce a



EUTECTIC POINT of nickel-phosphorus alloy at 1600°F is much lower than the melting point of either the base metal or elemental nickel.

HEAT TREATER adjusts atmosphere lines to retort in small batch-type firing operation. Larger pieces are done in continuous muffle furnaces.



NICKEL-PHOSPHORUS coating, shown at 500X, alloys with iron in the base metal to form an exceptionally strong bond at the interface.

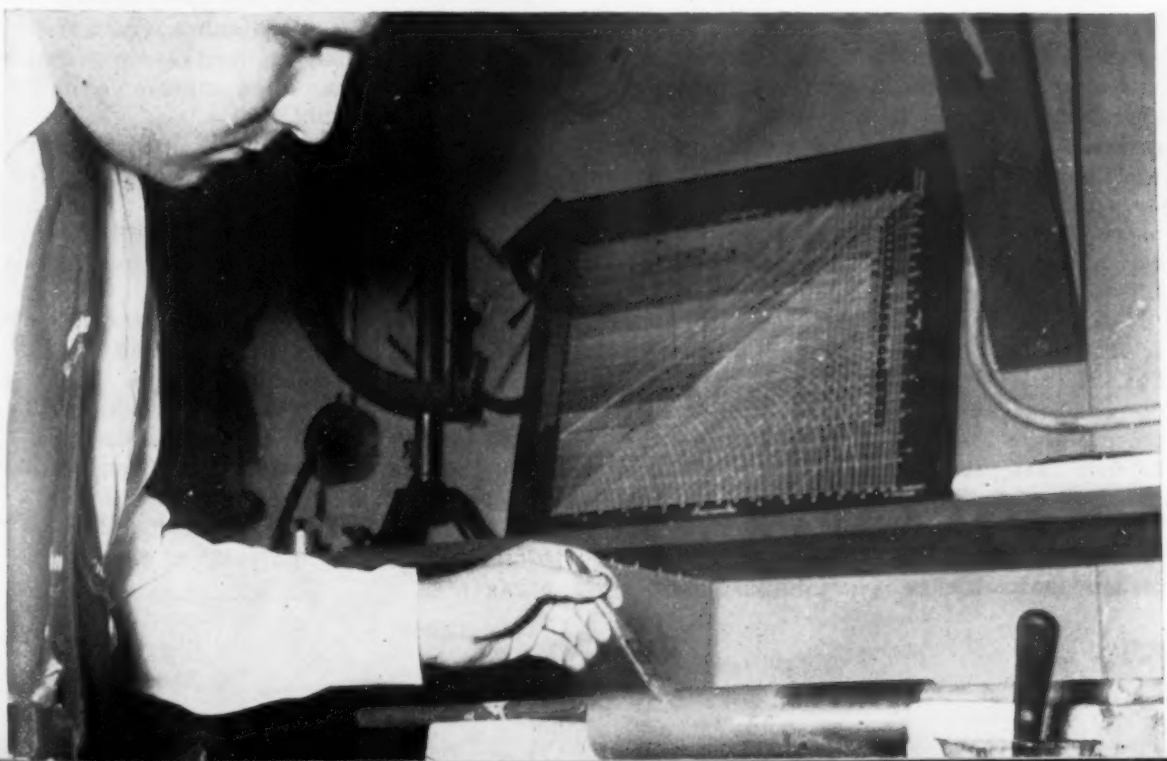
mixture of nickel and a nickel-phosphorus alloy. This mixture forms a protective coating in which the percentage of phosphorus is usually less than 3 pct.

The process is a very economical method of putting a corrosion resistant coating on many objects. The raw materials are readily available. Green nickel oxide ranges in price from $0.65 to $3.50 per lb, depending on the fineness and quantity desired. Dibasic ammonium phosphate costs about $0.15 per lb, also depending on the quantity purchased. A pound of raw material will cover about 25 sq ft when the coating is 0.001 in. thick. At this rate, the chemicals cost a few cents per square foot.

Furnace and atmosphere costs per square foot are also extremely low due to the rapidity with which the reaction takes place. By using continuous-feed atmosphere-controlled furnaces, high production can be achieved at very low unit cost.

To coat the inside surfaces of pipes, the initial mixture of nickel, dibasic ammonium phosphate and water is run through the pipe while it is rotated. The coating is dried, then fired by simply passing the pipe either through rotary burners or an induction coil. Reducing atmosphere can be passed through the pipe and burned at the other end while firing takes place.

MIXTURE of nickel oxide, dibasic ammonium phosphate and water is painted on black iron pipe for sampling technique prior to production run. Pipe is then fired at 1600° to 2000°F.



Patternmaker can help—

Lower Foundry Costs Start With Part Design

By Edward W. Moir
Pattern Shop Superintendent
Howard Foundry Co.
Chicago

◆ Cutting castings costs starts with part design . . . A good way to be sure of lowest casting cost, high production rates, top quality, is to take advantage of the patternmaker's know how . . . Close liaison between patternmaker and design engineer is recommended.

◆ In planning castings, avoid core designs which make foundry production difficult . . . Aim for simplified rib design . . . In some cases two cast parts may be cheaper than one part with complex design . . . Where large cores are necessary, a two seat position for core is desireable to eliminate balancing problems . . . Redesign of pad contour may improve casting soundness.

◆ PATTERNMAKERS hold a key position affecting both casting cost and quality. More and more, large users of sand castings are encouraging a closer liaison between patternmakers and engineering departments. Aim is to work out pattern and foundry problems before drawings are blueprinted—to avoid later "engineering" changes and resulting higher foundry costs. This close coordination is especially useful when complex designs are involved.

The patternmaker can often assure better founding qualities, lower scrap loss, higher production, and reduced costs. He can suggest design changes to avoid structural failures and other defects that might otherwise appear in finished cast parts. Both reasons come under the heading of improved design.

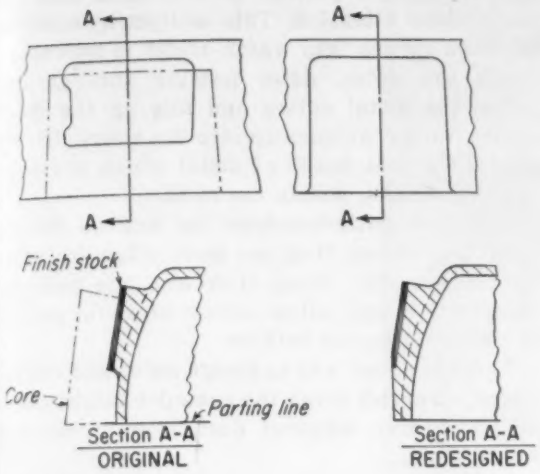
The engineer can help both foundry and pattern shop produce sound sand castings by gaining a wider knowledge of how design and molding methods affect each other. Collaboration with the patternmaker in the early design stages, however, can often improve design and lower costs by eliminating:

(1) Loose draw-back pieces, used to prevent "tearing" of the sand when drawing pattern equipment out of the mold.

(2) Paste-in cores, used in pattern areas which are free-drawing and require separate set-in cores.

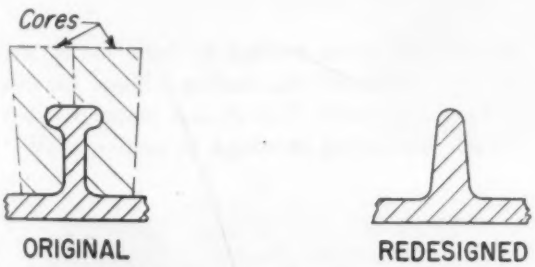
(3) Regular cores by using a substitute design as shown in the cases illustrated.

Several common molding problems stem from part design. Most of these designs can be produced by a foundry. In each typical case shown here, however, a "request for engineering change" was made. Closer contact with the patternmaker on the original drawings would have avoided the delays and costs of these design changes.



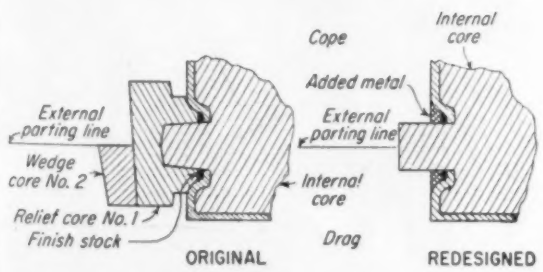
Pad Design

Separate cores needed to mold this pad design made foundry production costs higher. Slight redesign of pad contour eliminated cores. A cleaner, sounder casting was produced at lower cost. If weight reduction is the objective, as in magnesium castings, the slight metal fill-in of the redesign represents an insignificant weight increase.



Simplified Rib Design

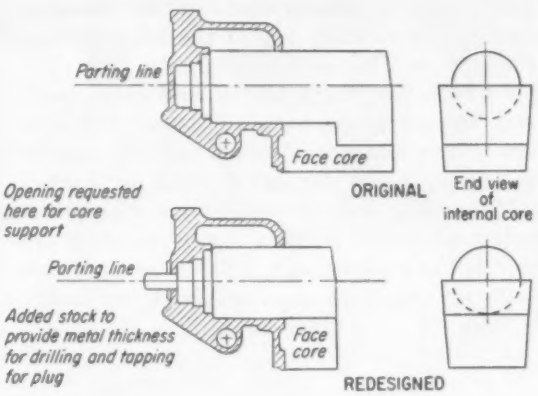
Keep ribs simple and save casting costs. T-shaped ribs specified originally required pasted ram-up cores. Coring and cleaning were eliminated and production time lowered when engineers switched to heavier plain rib which proved just as effective.



Core Design

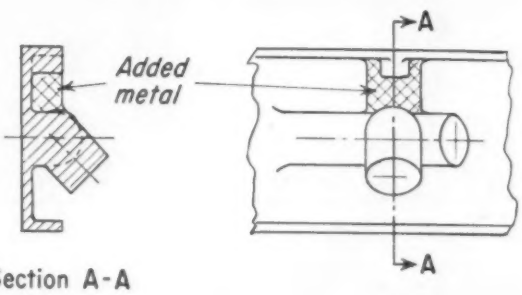
In meeting a request for redesign of this part, engineers had to weigh value of lower pattern and casting production costs against increased machining costs. To mold the original design, a relief core (1) and wedge core (2) were needed. Cores had to seat perfectly, but if chance sand got in between cores the internal core would not seat properly. Also, if sand got into the mold cavity, sand holes in casting could result in rejects.

To avoid this molding problem, extra finish stock was added. This eliminated need for two cores, which were also difficult to assemble in the mold. Now, the internal core can be quickly and easily set into position. Revised molding also results in a more positive core seat for the internal core.



Core Design

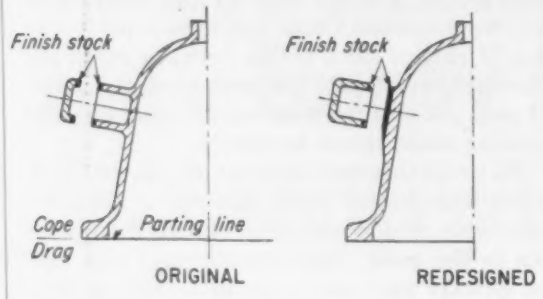
Core balancing problems always prove troublesome in foundry practice. Original design required extra large core print to balance core. Even so, this method would not hold core perfectly. Engineers permitted redesign to obtain a ¾-in. opening to seat core in positive position. This eliminated need for a large core print, provided firm support to hold core perfectly in sand mold. A smaller core and register could be used to locate core.



Feeding

Feeding is a comon problem with thin-wall castings. Here extra stock was added to help cast heavy metal pipe line against thin metal wall. Without extra stock, there was no adequate way to feed metal. By filling in, however, metal shrinkage was prevented in a critical area.

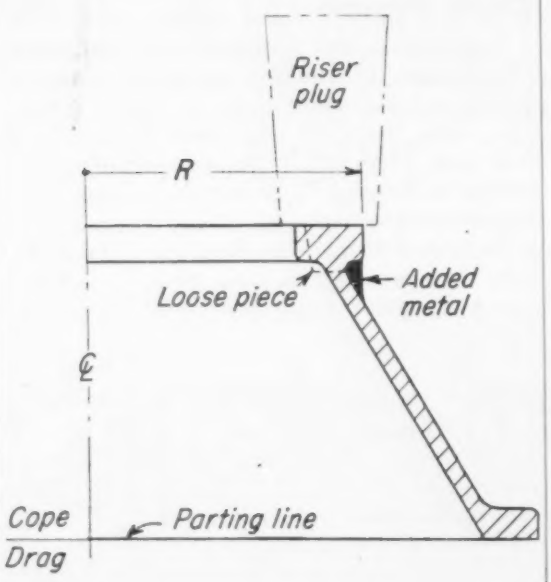
Typical Design Problems



Chamber and Cover

Original chamber and cover design of this bell housing appeared simple on the drawing board, was actually one of the most difficult foundry molding problems.

In redesign, the chamber and cover were cast separately from the bell housing. Finish stock was added to both. Need for special cores to prevent damage to sand mold when withdrawing pattern equipment was eliminated. Redesign made a simple molding design out of an extremely difficult one, lowered costs up and down the line. Same end-result is achieved with redesigned mold.



Undercuts

Addition of a small amount of metal can often save thousands of dollars in pattern equipment and casting costs.

Original design showed a small but troublesome undercut. To mold this undercut required loose draw-back pieces. By simply adding a small amount of metal, the loose pieces were eliminated. Better production was obtained in the foundry and sand can't fill in or "tear" out.

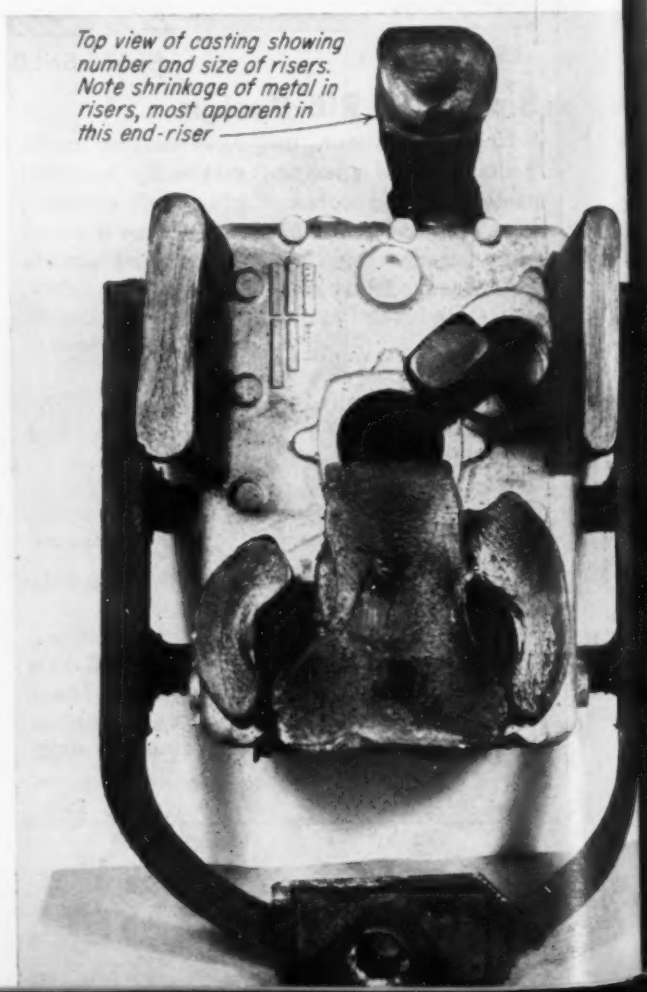
Gates and risers which are manufactured and applied after a pattern is assembled also deserve close attention. This equipment consists of down-sprues into which metal is poured to reach the gates. After passing through the gates, the metal enters and fills up the mold cavity, then continues up into the risers. Risers produce a "hot head" of metal which prevents metal shrinking within the mold.

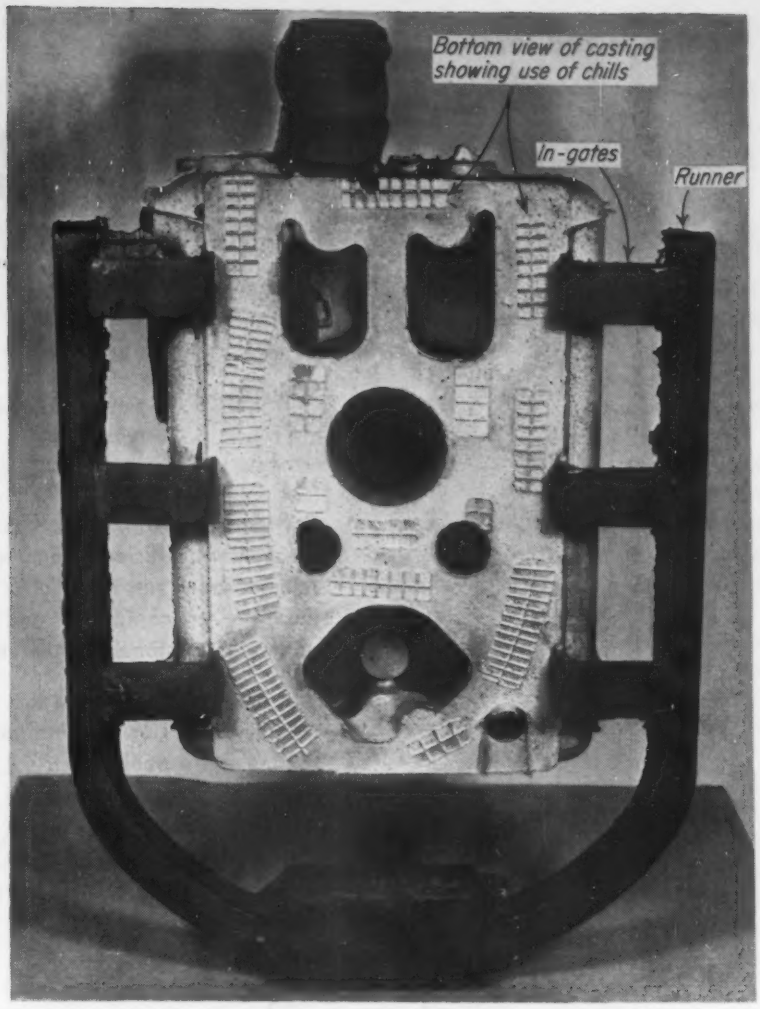
Although patternmakers can and do design gates and risers, they are most often designed by the foundry. When they are, the patternmaker will simply allow certain areas for gating in constructing the pattern.

There is no set way to design gates and risers. Three foundries given the same job might come up with three different designs to produce a sound casting.

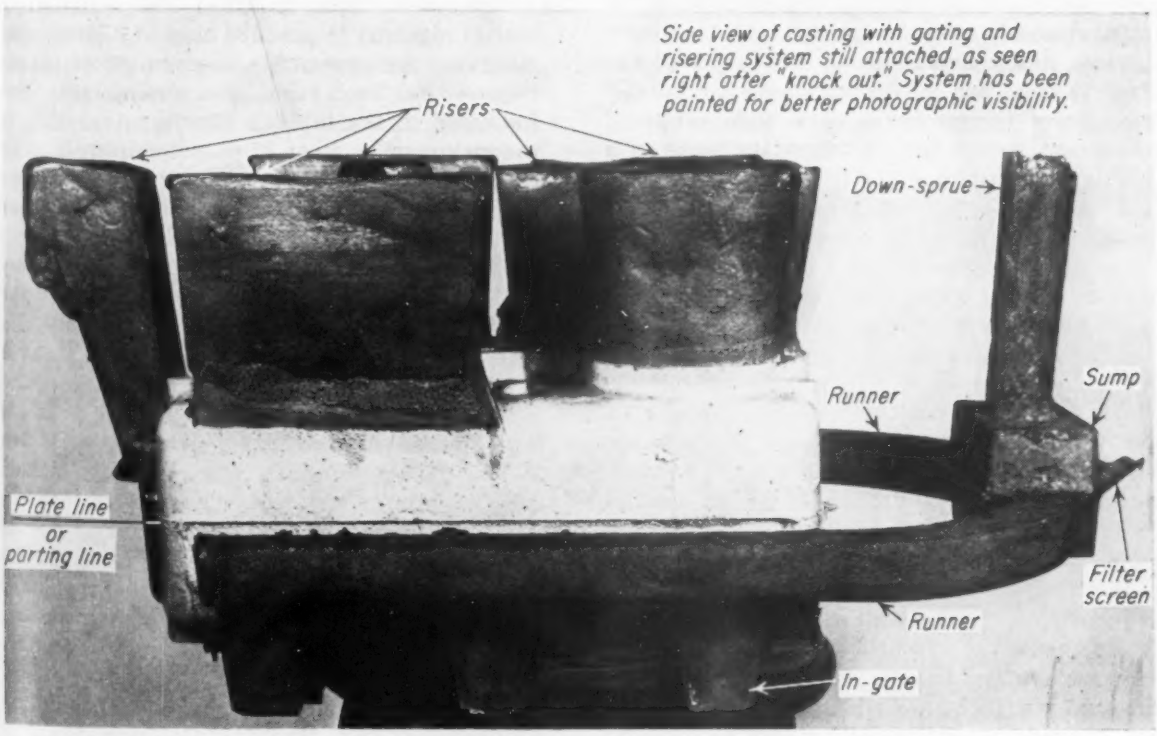
The relationship between a foundry and patternmaker, or pattern shop, is usually close. The patternmaker needs to know what size flask the foundry uses. He also must be aware of the foundry's molding method. One foundry may mold with the pattern equipment lying down. Another may prefer to stand the equipment up. Pattern equipment must be designed to fit individual foundry molding techniques.

SIX RISERS were needed to feed metal into heavy sections of this casting. Risers provide hot head of metal. Top of each metal riser has shrunk, preventing shrinkage in casting itself.





FIFTEEN IRON CHILLS were required to cool metal in each chill-area. Chills, applied during casting development, are used wherever it is impractical to feed heavy sections with risers.


Side view of casting with gating and risering system still attached, as seen right after "knock out." System has been painted for better photographic visibility.
Risers
Down-sprue
Runner
Sump
Plate line or parting line
Filter screen
Runner
In-gate

SIDE VIEW OF CASTING after knockout shows large amount of metal used in gate and riser system. Screen in sump filters metal, slows metal flow, reduces turbulence during pouring.

Rolling mixed lots—

Flexible Bar Mill Equipment

By W. G. Patton
Asst. Technical Editor

◆ Rotary Electric Steel Co. has bet $12.5 million that a fully mechanized, efficiently modern semicontinuous bar mill can retain the desirable versatility of a hand-operated bar mill . . . Unusual flexibility of equipment and operating methods permits prompt service to customers while retaining close control of bar quality.

◆ Rotary is rolling mixed lots of carbon, alloy and stainless to tight specifications . . . Size range of ½ to 4½ in. is probably unique for the entire steel industry . . . Production of cold finished stainless bars during February marked an ambitious extension of its growing stainless steel program . . . A new 20-ton electric furnace will facilitate melting of special alloys and also permit desirable stock balancing by Rotary and its customers.

◆ INGOT CAPACITY of Rotary Electric Steel Co. has increased 190 pct since 1946. As in the case of other steel producers, getting out maximum production occupied much of management's attention prior to 1954. Nevertheless, the company never lost sight of the fact that a bar mill that would be quickly responsive to the needs of a wide range of customers would find an important place in a highly competitive postwar market.

Plant layouts for future expansion at Rotary have kept flexibility of operations prominently in mind. Melting units and metallurgical control equipment were selected with versatility, a prominent requirement. Bar mill equipment selections, including heating facilities, gave particular attention to flexibility of operations.

An important result of Rotary's basic plan for wide flexibility is the range of its semicontinuous bar mill which rolls rounds, squares and hexes from ½ in. diam to 4½ in. This is believed to be one of the largest, if not the largest size range of any U. S. bar mill.

It is unusual for a bar mill to produce, simultaneously, low carbon, alloy and stainless bars on the same facilities. Intelligent scheduling is necessary but such a program could not be attempted without flexible melting units, modern controls, versatile rolling mill and conditioning equipment and know how acquired through years of bar mill experience.

The table on p. 135 gives a detailed list of bar sizes currently being rolled by Rotary. Billet sizes are also shown.

The same table indicates the number of stands required to produce bars of a particular size. Through experience, the number of passes required has been reduced to a minimum. Not indicated in the table is the fact that this is the maximum number of passes required. For square bars of a particular size, the number of passes is frequently less than the number shown.

With the completion of new equipment now being installed, Rotary will have facilities for straight-away production of bars over 2½ in. diam.

Ingenious guides automatically direct the steel into the rolling stands so that manual handling is not required. Where bar sizes 1 1/16 in. and under are rolled, repeater stands are employed.

At the present time, Rotary's melt shop has 5 top-charging electric furnaces rated at 60 tons each. These furnaces are used regularly to produce plain carbon, alloy and stainless steels. A new 20-ton furnace was recently installed.

Stripping is done by a 250-ton Pittsburgh Engineering and Machine Co. portable hydraulic crane, a 200-ton Dorr-Patterson stationary hydraulic and a 600-ton Birdsboro

Permits Fast Service, Close Control

stationary hydraulic mechanism is also used.

Seven soaking pits of Amsler-Morton design, single burner, bottom fired with recuperators are in service. In addition, two Steel Processing Co. soaking pits are used. With one exception, all soaking pits are oil fired. A new Amsler-Morton unit is gas fired. Leeds and Northrup controls are the latest and most modern design.

The 36 in. two-high Birdsboro reversing blooming and slab mill has 36 x 78 in. long rolls. Power is supplied by a 4000 hp Allis-Chalmers motor operating at 50 to 120 rpm, 700 v. The motor generator set for this mill includes a 3500 hp, 500 rpm ring motor with flywheel and two 1750 kw, 700 v generators.

Fast roll changes

Maximum opening between blooming mill rolls is 44 in. Three sets of blooming mill rolls meet the range of requirements for Rotary's products, another example of the versatility of the equipment.

Following blooming operations, a Linde hot scarfing machine desurfaces 4 sides of the bloom simultaneously. Table speeds from 70 to 210 fpm are possible while desurfacing material to a depth of 1/32 to 3/32 in. This machine will descale a 55 ft length 6 x 6 in. bar in just 40 sec.

After shearing in a 770 ton Birdsboro-Sack shear, billets are processed in four 2-high Birdsboro continuous stands with 22 in. x 51 in. rolls. Each pair of stands is powered by a 2000 hp synchronous motor at 300 rpm through two reducers.

An interesting feature of the Rotary bar mill operation is the fact that No. 1, 2 and 3 roughing stands require no roll changes except for redressing. Both the mills and the rolls, however, were designed to permit quick changes and adjustments when necessary.

One reason for the efficient operation of a bar mill producing a great variety of shapes and sizes is sound scheduling. At Rotary, tentative rolling schedules are set up according to bar size, see table p. 135.

This rolling sequence is followed as far as may be practical. However, it is often possible to break into the melt shop schedule and permit a new order to "catch up" with the regular rolling schedule of a certain bar size. This often shortens delivery time, thereby making it possible to improve service to customers. A substantial part of the new order can often be processed in the time that would ordinarily be required to make an additional roll change.

The problem of mill downtime resulting from frequent roll changing has increased rapidly since last July. The following index numbers show the relative frequency of roll, section or mill housing changes at Rotary by months.

MELT SHOP has five top charging electric furnaces rated at 60 tons capacity each. A new 20-ton electric furnace was recently installed. Ingot capacity has increased 190 pct in 8 yr.

Frequent roll changes reflect variety of steels ordered and tendency to smaller orders . . .

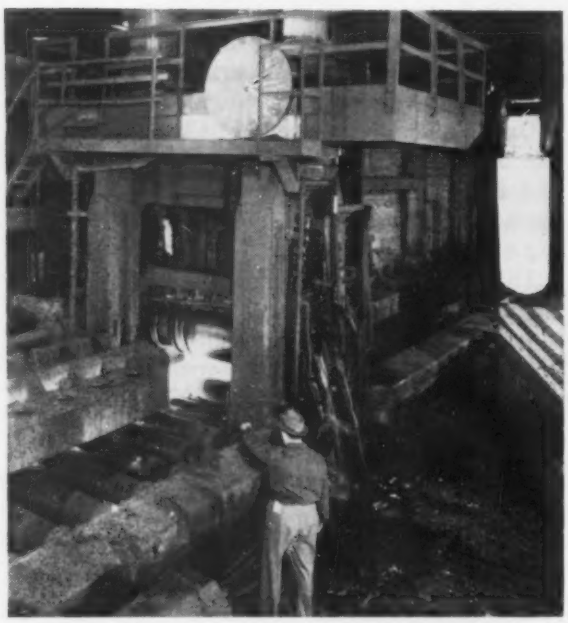
Whereas last year, a bar mill such as Rotary might be required to change rolls, say 1½ times per turn, the frequency of roll changes and adjustments and housing changes is now 5 times per 8-hr turn. The increased frequency of roll changes reflects both the increasing variety of steels ordered and the tendency toward ordering smaller tonnages, according to Rotary officials.

Month		Index*
August.	1953	182
September	"	239
October	"	184
November	"	198
December	"	236
January	1954	209

* 1952 average equals 100.

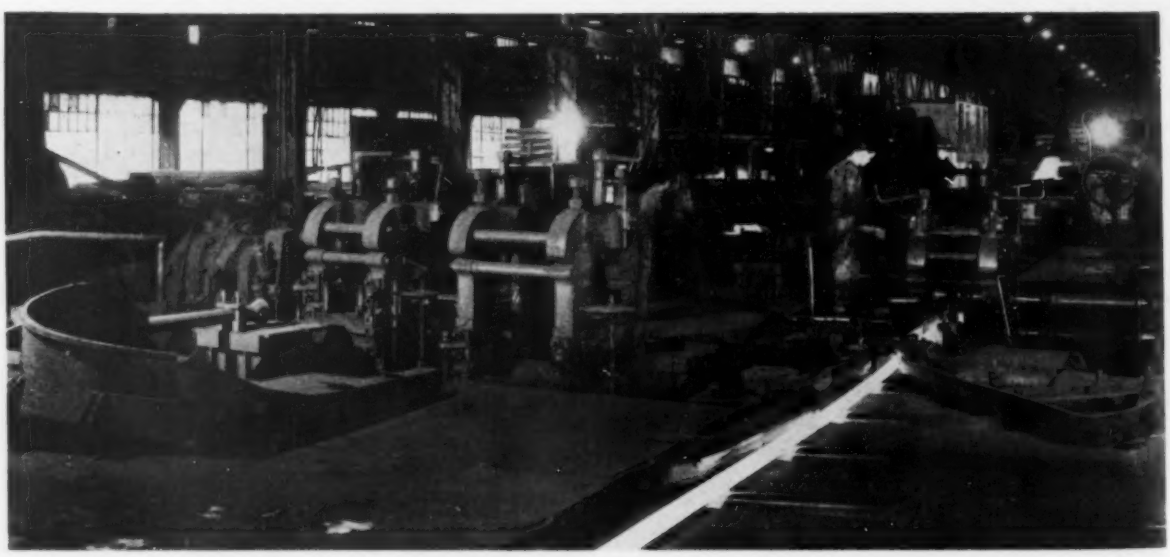
Because of the variety of steels being rolled, close control of bar mill furnace temperatures is essential. By grouping orders together, the heating problem is simplified somewhat. Even so, it may be necessary to change furnace temperatures very rapidly or even to use spacers in the furnace to insure proper heating.

Normal rolling temperatures for all types of



TWO-HIGH reversing and blooming mill has 36 x 78-in. long rolls. Maximum opening between the rolls is 44 in. Three roll sets are used.

BARS passing through a rolling mill stand. Mills and rolls are designed to permit quick adjustment. Guides are seen in the foreground.



CLOSEUP of the looping setup. Steel rides on the rolls shown in foreground and is automatically directed into the proper roll opening. Rolling schedules are set up according to bar size.

steel being processed by Rotary range from 1975 to 2350°F. Normal practice of steadily increasing or steadily decreasing the required rolling temperature minimizes the number of furnace adjustments that are necessary. Under today's operating conditions, the complete cycle of rolling sizes may be covered in as little as 2½ weeks.

The Continental 10-stand bar mill produces bar stock ranging from ½ to 4½ in., inclusive.

No. 1, 2 and 3 stands are two-high roughing stands, equipped with 21 in. x 42 in. rolls. Rolls are powered through three reducers by a 900 hp, 600 v 200/600 rpm dc mill motor.

Stands 4-5 and 6 use two-high housings and 18 in. x 36 in. rolls.

Stands 7 and 8 use two-high housings and 13 in. x 20 in. rolls.

No. 9 is a three-high stand and No. 10 is a two-high stand. Each mill has 13 in. x 20 in. rolls.

Rotary has one of the most modern semi-finished conditioning shops in the country. This shop is equipped with 13 Mid-West Abrasive Co. automatic grinding machines driven by 30 hp ac motors. A 20 in. x 8 in. x 2½ in. abrasive wheel is mounted on a frame that is hydraulically operated and controlled.

In addition to much greater production per man-hour and sq ft of floor space, the new equipment provides uniform, all-over grinding; at the same time it eliminates one of the most tedious and hazardous jobs in a steel mill.

Rotary also maintains swing grinders and other conditioning equipment that may be used where surface condition is less critical than in stainless and some other higher alloys.

A wide range of pickling, heating and cold finishing facilities is available to meet customers' specifications. In addition to draw benches, and straighteners, Rotary is equipped to provide turning and centerless grinding to specification. A battery of 8 straightening machines, three turning machines and seven Cincinnati centerless grinders are available. There are ten 6 ft x 40 ft concrete pickling tanks.

Annealing heat treating and tempering facilities comprise 13 furnaces, including car types, continuous, conveyor and pusher types. All furnaces are equipped with Leeds and Northrup Micromax recording-controlling instruments, air-oil proportioning valves and Chromel-Alumel thermocouples. A new Drever continuous furnace for stainless steel now being installed will operate at 2300 deg F. Water cooled conveyor rolls are protected by silicon carbide.

In addition to a modern metallurgical laboratory, Rotary maintains an efficient chemical laboratory. To help control chemistry of its steel, a Baird direct reading spectrometer furnishes chemical analyses minutes after samples have been brought to the laboratory via vacuum tube. Rotary also uses telautograph to direct and control its operations. Three to four samples are analyzed during each heat.

With the aid of its modern equipment, Rotary is able to control the quality of its products during every step of the processing cycle—raw materials, melt shop, ladle conditioning, mold conditioning, soaking pit, rolling mill, finishing stands, surface removal and cold finishing.

FACTS ABOUT THE MILL

ROLLING SEQUENCE

½ to 1 1/16-in. hexes.
½ to 1 1/16-in. rounds.
1 to 1 3/16-in. rc squares.
1⅛ to 1 9/16-in. hex.
1 3/16 to 1¾ rc. squares.
1⅝ to 1 15/16-in. hexes.
2 1/16 to 3 9/16-in. rounds.
4½ down to 2-in. squares.
3⅝ to 4½-in. rounds

Bars are scheduled for rolling in this order so equipment can be used to the best advantage. It also avoids delays in processing.

STANDS REQUIRED

Rounds
½ to 1 1/16-in. in 10 stands.
1⅛ to 3½-in. in 8 stands.
3⅝ to 4½-in. in 6 stands.

Squares
1¾ to 2¾-in. in 8 stands.
2⅞ to 4½-in. in 6 stands.
4⅝ to 5⅛-in. in 4 stands.

Hexes
½ to 1-in. in 10 stands.
1 1/16 to 2¼-in. in 8 stands.

SIZES ROLLED

½ to 1 15/16-in. rounds (1/64-in. increments).
2 to 4-in. rounds (1/16-in. increments).
4⅛ to 4½-in. rounds (⅛-in. increments).
½ to 47/64-in. rounds—3-in. sq billet.
¾ to 1 15/16-in. rounds—4-in. sq billet.
2½ to 2⅞-in. rounds—5½ or 6-in. sq billet.
2 to 2 7/16-in. rounds—5-in. sq billet.
3 to 4-in. rounds—6-in. billet.
4⅛ to 4½-in. rounds—6½-in. billet.
¾ to 1 9/16-in. hexes—4-in. billet.
1 5/32 to 1¾-in. hexes—5-in. billet
1¾ to 2⅛-in. squares—5-in. billet.
2¼ to 2⅞-in. squares—5½-in. billet.
3 to 5⅛-in. squares—6½-in. billet.

Aluminum killed steels—

How Dissolved Nitrogen Affects Graphitization

By G. V. Smith
Metallurgist
Research Laboratory
United States Steel Corp.
Kearney, N. J.

◆ Nitrogen dissolved in aluminum killed steel inhibits graphitization, recent studies made by U. S. Steel Corp. have shown . . . Failure of welded molybdenum steam pipe in service as a result of graphitization set metallurgists hunting for the "how and why" of this problem.

◆ Instability of iron carbide, Fe_3C, is the heart of the graphitization problem . . . Tests results show increased susceptibility to graphitization as the amount of dissolved nitrogen decreases . . . Deoxidation products of aluminum do not appear to serve as nuclei for graphitization . . . Combined as Al N, nitrogen does not affect graphitization.

◆ DISSOLVED NITROGEN may well be a controlling factor in inhibiting graphitization of aluminum deoxidized steels, the Research Laboratory of U. S. Steel Corp. found in recent studies. Interest in the study stemmed from failure by graphitization of a welded molybdenum steel steam pipe after 5½ years of service at 935°F and 1250 psi steam pressure.

Iron carbide, Fe_3C, in plain carbon and some low alloy steels is unstable and inverts to graphite and ferrite at equilibrium. Amount of aluminum added in deoxidation has been found to be one of the most influential variables in whether steel graphitizes and the rate of graphitization. If 1 lb of aluminum per ton is used, the steel may be readily graphitized. If only a small quantity of aluminum is used, the carbide may in some cases resist all attempts to break it down.

To determine how aluminum deoxidation promotes graphitization, two steels of approximately eutectoid carbon content, deoxidized with silicon and a relatively large amount of aluminum, were used. These were chosen because, unlike low carbon steels, they could be graphitized in a relatively short time.

Effect of initial microstructure on susceptibility to graphitization, and best temperature for forming graphite were found. Samples heated in air for ½ hour at 1600°F were either furnace cooled, air cooled or water quenched and then reheated in air for 10 days at 1100°, 1200° or 1300°F. Quenched samples were largely martensitic. Furnace and air cooled specimens were pearlitic with coarse and fine interlamellar spacing, respectively.

No graphite developed in the pearlitic samples, but an appreciable quantity appeared in the originally martensitic specimens. The extent was about the same at 1100° and 1200°F but somewhat less at 1300°F. Subsequently a graphitizing treatment of 10 days at 1200°F was chosen.

Aluminum deoxidation restrains grain growth at austenitizing temperatures below about 1800°F. This is generally attributed to nonmetallic inclusions (AlN), resulting from deoxidation. Therefore, the effect of austenitizing temperature on the number of graphite nuclei in promoting graphitization was studied.

Samples of the two steels were heated for ½ hour at from 1400° to 2300°F in 100°F intervals, quenched to form martensite and then reheated in crushed coke at 1200°F for 10 days. The variation of graphitization with change of austenitizing temperature near the center of

samples of Steel 1 is shown in Figs. 1 and 2.

The number of graphite nodules per unit area increases with temperature to a maximum at 1600°F, then decreases. There is apparently no discontinuity associated with the grain coarsening which occurs at 1800°F. The shape of the curves indicates that at 1600°F the graphite nucleating agent is made less effective by solution or otherwise.

During testing, a graphite-free surface was noted in the samples. This was first suspected to be surface decarburization due to heating in air. However, Fig. 3 shows only a slight loss of carbon at the very surface while a great deal of graphite free rim still remains. Apparently, the graphite-free rim is due to stabilization by either oxygen or nitrogen from the air atmosphere. Alternatively, the nuclei for the reaction had been destroyed. An approximately linear relation was obtained on plotting the logarithm of the square of the rim thickness for a given time versus the reciprocal of the absolute temperature in accordance with diffusion theory.

How samples were treated

The carbide stable rim was noted, Fig. 4, when austenitizing was carried out in crushed coke. If the steel was then graphitized in deoxidized lead, rim thickness was slightly less than when austenitized in air. When the graphitizing anneal is done in air, the rim is not as thick as for samples heated in deoxidized lead. The rim seems absent where prior austenitizing was in crushed coke. Reduced rim thickness is attributed to loss of metal by surface oxidation. Samples austenitized in purified helium showed no carbide-stable rim.

Nitrogen works with aluminum

Tests were made in purified nitrogen and in various oxygen-containing atmospheres. In nitrogen, Fig. 5, the rim formed is not completely free of graphite. Rim thickness, however, increased linearly with the square root of the austenitizing time. Results suggest that nitrogen penetrates the steel to combine with residual aluminum and inhibit graphitization. Experiments in oxygen-containing atmosphere were inconclusive because of scaling and decarburization.

Based on Darken's formula, computations were made to determine whether the observed penetrations of nitrogen matched that to be anticipated mathematically. Agreement of the observed and computed rim thickness, assuming nitrogen as the responsible agent, is satisfactory.

Austenitizing Treatment	Rim Thickness, cm	
	Observed	Computed
6 hr at 2000°F in Ni	0.08	0.10
24 hr at 1800°F in Ni	0.098	0.128
1 hr at 2000°F in crushed coke	0.036	0.041

Although it was not possible to make a simi-

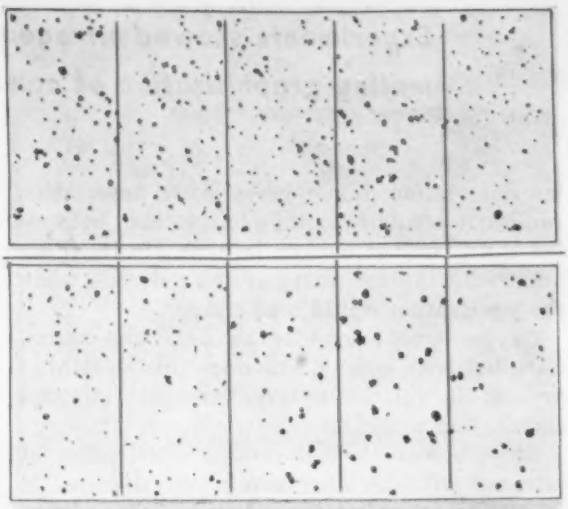


Fig. 1.—Effect of austenitizing temperature on graphitization. Austenitizing temperatures start at 1400°F, top left and rise in 100° increments to 2300°F, lower right. Unetched. X250.

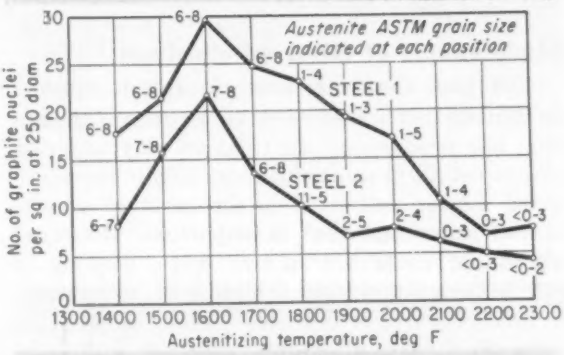


Fig. 2—Number of graphite nuclei formed at the various austenitizing temperatures.

Fig. 3—Graphite-free rim at surface of sample heated ½ hr at 2000°F in air. Unetched. X100.

Experiments showed nitrogen inhibits aluminum's effectiveness in promoting graphitization of commercial carbon steels . . .

lar calculation for oxygen, such penetration could not account for the observations because the diffusivity of oxygen is approximately one hundredth that of nitrogen and only one tenth the penetration would take place.

Oxygen would combine not only with aluminum, but with silicon, and since this element is present in relatively large amount, subscale penetration would be greatly slowed.

Experiments showed inward penetration of nitrogen inhibits aluminum's effectiveness in promoting graphitization of commercial carbon steels. It is reasonable to expect that nitrogen content of steels is an important factor in their graphitization resistance and seems to be borne out in practice. Bessemer steels, high in nitrogen, are generally more resistant to graphitization than openhearth steels.

Study effects of dissolved aluminum

The fact that nitrogen absorption inhibits graphitization would seem to disprove the idea that the products of deoxidation play any role in promoting graphitization in aluminum-deoxidized steels; rather, it is the residual or dissolved aluminum that is important. Dissolved aluminum could act in two ways, keeping in mind that nitrogen can inhibit its effectiveness.

Aluminum may directly enter in solution with Fe_3C. Or, aluminum may act indirectly as a scavenger for nitrogen which in turn either stabilizes Fe_3C or inhibits its breakdown.

To test these possibilities, relative amounts of uncombined nitrogen and aluminum in several steels were changed by heat treatment, and their effect on graphitization susceptibility determined.

Experimentally melted heats of approximately eutectoid carbon steels were prepared, Table II. Only those steels containing relatively low aluminum failed to show appreciable graphite when quenched from 1600°F to form martensite and heated 10 days at 1200°F.

Two treatments compared

To explore the effect of different amounts of uncombined aluminum and nitrogen, four steels showing greatest susceptibility were given two different austenitizing treatments, prior to graphitizing at 1200°F. These were heated at 2100°F for 1 hr in vacuum and brine-quenched to room temperature, or, quenched to 1400°F, held for 2 hr and then brine-quenched to room temperature.

Heating at 2100°F was to obtain relatively high uncombined nitrogen and aluminum contents. The treatment involving interruption at 1400°F sought to develop a minimum of uncombined aluminum and nitrogen after the same austenitizing treatment as the comparison samples. Since the steels contained much more aluminum than nitrogen, the uncombined quantity of aluminum changed relatively little.

After graphitizing at 1200°F for 10 days,

Steels Picked To Speed Data

Steel	C	Mn	P	S	Si	Ni
1	0.79	0.62	0.011	0.025	0.23	0.02
2	0.75	0.55	0.025	0.032	0.20	0.02
Steel	**Cu**	**Zr**	**Cr**	**Ti**	**Al**	**Al_2O_3**
1	0.03	0.01	0.02	0.01	0.069	0.004
2	0.06	0.01	0.04	0.01	0.046	0.006

Steels With Graded N And AL Used

Steel	C	Mn	P	S	Si	N	Al
A	0.75	0.56	0.023	0.017	0.17	0.005	0.002
B	0.75	0.55	0.021	0.017	0.18	0.005	0.071
C	0.74	0.55	0.022	0.016	0.18	0.005	0.170
D	0.80	0.59	0.023	0.017	0.17	0.008	0.001
E	0.79	0.56	0.023	0.019	0.16	0.008	0.060
F	0.74	0.52	0.021	0.018	0.16	0.010	0.153
G	0.80	0.53	0.023	0.021	0.15	0.010	0.022
H	0.80	0.52	0.023	0.021	0.15	0.012	0.060

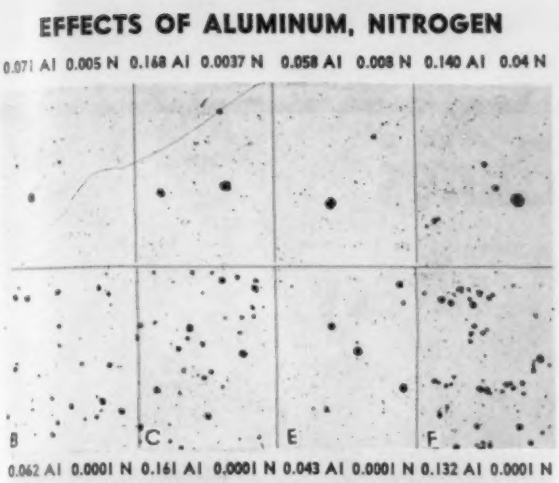


Fig. 6—More graphite formed in samples with quench interrupted at 1400°F, bottom, than in those quenched directly from 2100°F. Steels B, C, E, F, left to right, were graphitized at 1200° F for 10 days. Direct quenched samples contained more aluminum and nitrogen. Unetched. X100.

more graphite formed in samples whose quench was interrupted at 1400°F than in those cooled without interruption, Fig. 6. Uncombined aluminum and nitrogen are indicated in the figure. These were computed using the variation of the solubility product of AlN in steel recently reported by Darken, Smith and Filer.

Results show increased susceptibility to graphitization with decrease in the amount of dissolved nitrogen, the dissolved aluminum changed only slightly.

A sample of a purified iron-carbon alloy containing about 0.5 pct carbon and less than 0.001 pct nitrogen and no spectrographically detectable aluminum was completely graphitized after quenching from 1600°F and reheating to 1200°F for 10 days.

Purified alloy also checked

To determine the effect of added nitrogen on the graphitization susceptibility of this alloy, a sample of the steel was heated at 1400°F in nitrogen at a pressure of one atmosphere for 18 hours. Amount of absorbed nitrogen was computed at about 0.03 pct. This specimen was then given the same austenitizing and graphitizing treatments as the unnitrided sample and failed to show any graphite. The nitrided sample was reheated to 1200°F and held for 750 hr but still showed no graphite. Shorter time exposures of the purified iron-carbon alloy at 1200°F showed graphite formation starting in 2 hr and completing in less than 24 hr. The purified alloy graphitized much more readily than commercial steels.

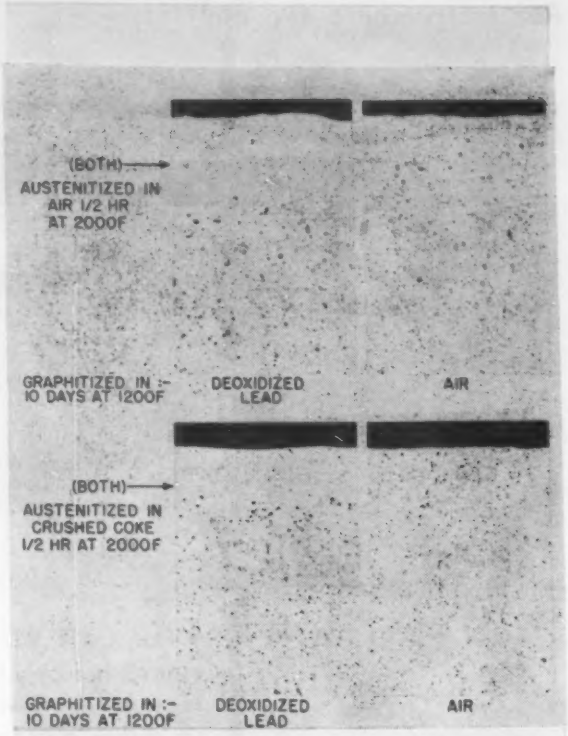


Fig. 4—Effect of atmosphere at austenitizing temperatures on graphitization. Unetched. X50.

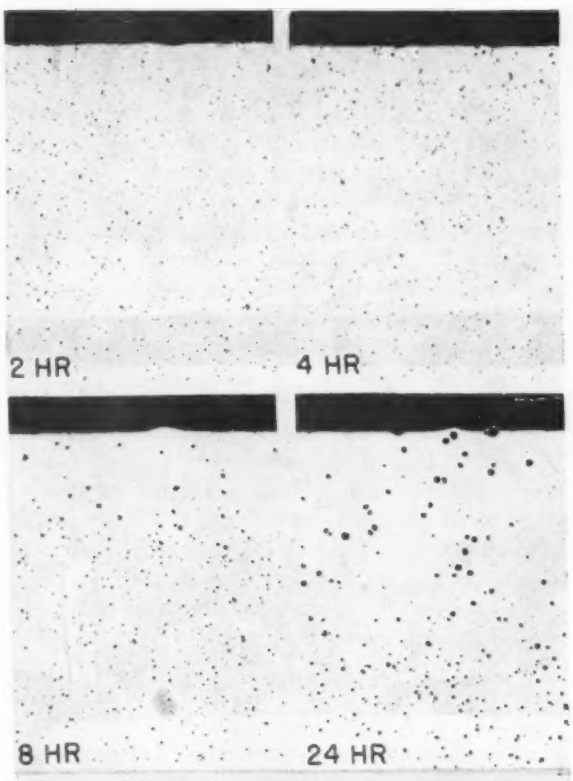


Fig. 5—Effect of austenitizing in purified nitrogen at 1800°F for times indicated. Graphitization was done in purified helium for 10 days at 1200°F. Unetched. X50.

For instruments and controls—

Precision Machines Assure Cam Accuracy

By Walter Jellig
Chief Tool Engineer
Ford Instrument Co. Div.
The Sperry Corp.
Long Island City, N. Y.

◆ Flat, spiral, 3-D and barrel cams transmit motion in instruments and controls to supply accurate data for observers, corrective measures when necessary . . . Quantity production of cams requires precision equipment for cutting masters and making accurate duplicates . . . Contours take careful plotting and close-tolerance machining.

◆ Flat cams are reproduced on a vertical milling machine at a 1 to 1 ratio . . . Spiral cams up to 2880° of rotation are duplicated on twin-table equipment . . . Three dimensional production cams are cut with spherical carbide burrs to 0.001 in. accuracy before final hand polishing.

◆ QUANTITY PRODUCTION of cams used in precision instruments and controls to impart data present many difficult machining problems. Unusual setups and special machines are often needed to obtain a high degree of accuracy and maintain required output. At Ford Instrument Co., Div. of The Sperry Corp, a large part of the cam making and duplicating equipment has been designed and built by the company.

Plot data points carefully

From a manufacturing standpoint, the cams fall into three major groups: (1) flat types operating through a maximum arc of 360°; (2) spiral grooved cams usually operating through a range of more than 360°; (3) 3-D or barrel cams.

The master for a flat cam is made of cast iron or nondeforming tool steel. Contour datum points are established by jig boring and the com contour is filed to a smooth blend between these points. The master cam is mounted on a fixture, then put on a vertical milling machine which reproduces production cams at a ratio of 1 to 1.

Spiral cams are either the radial or angular type. A radial cam operates a follower that travels in a straight line. Data are given in terms of polar coordinates. An angular cam operates a follower that travels in an arc. Its data are given in terms of angular displacement of the follower.

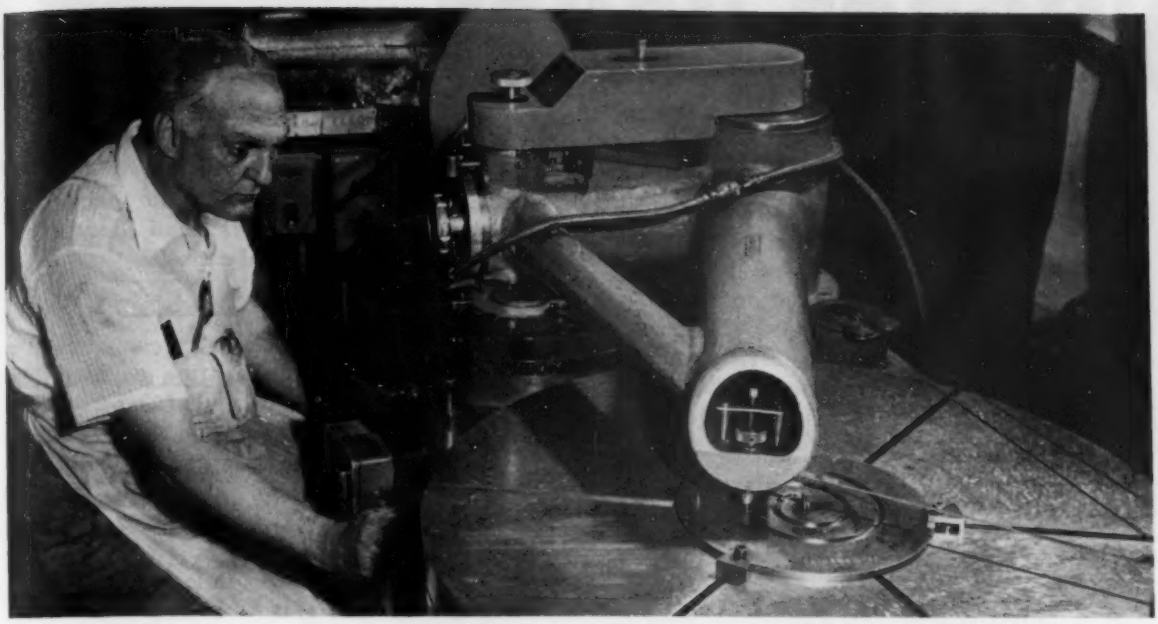
Spiral cam masters are made at a 2 to 1 ratio on a special machine designed and built by the company. Data for a master cam are plotted linearly on a 325-ft paper roll which is loaded into the cutting machine. Unwinding rate of the paper roll is controlled by a variable speed drive.

As the roll unwinds, the machine operator keeps the plotted line "on target" in the aperture of a movable sight which is carried on a steel band. A handwheel and variable speed drive set-up allows the operator to control the travel of the sight.

High ratios mean accuracy

Movement of the sight controls cutting head movement at a 500 to 1 ratio. The cutting head is carried on a pivoting lever arm at a preset distance of 5 to 14 in. from the pivot.

When an angular cam master is cut, the sight-carrying tape actuates the pivoted lever arm through a sprocket and worm. When a radial cam is cut, the pivot arm is locked at zero, a change gear disconnects the worm drive, and

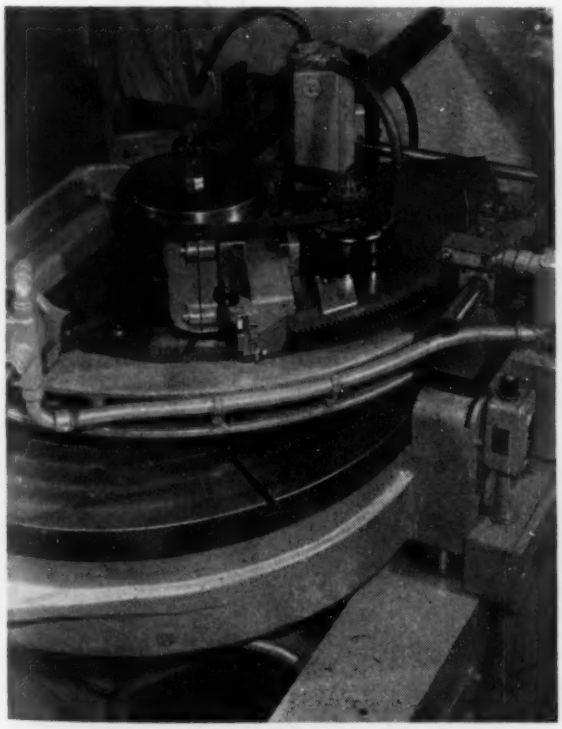


MASTER SPIRAL CAM on table in foreground is guide for production duplicate on table, rear.

the entire assembly is traversed in a straight line.

The spiral or angular cam, made to an accuracy of 0.0004 in. is mounted on the large table of the cutting machine. The production cam is located and clamped on the small table and the cam path cut to a tolerance of 0.001 in. The largest cam that can be cut is 18 in. in diam. To date, 2880° of rotation per cam is the most we have cut.

Three-dimensional or barrel cams are also either the radial or angular type. The method of cutting master cams for these two types varies, but production cams are made on the



CUTTING-HEAD of special machine built by Ford Instrument for making spiral cam masters.

MASTER CAM data are plotted on a paper roll, cutter guided by "sighting" on the data line.

As many as 2000 data points may be located to establish precise contour of a master cam . . .

same equipment also designed by Ford.

A three-dimensional radial cam master is cut on a jig borer or a Gorton vertical milling machine. The master cam, mounted on an arbor, is indexed to the proper angular position by means of a dividing head. A spherical carbide cutter, mounted in the machine spindle, is fed down to the ordinate dimensions specified on a cam data sheet. Some of these cams require as many as 2000 spots to precisely set the master contour.

Filing blends contours

The master is painted with prussian blue and high spots between datum points are filed to blend the contour. If properly filed, a small spot of blue will remain in the tiny spherical well made by the cutter. Caution must be taken not to remove this blue spot; its removal indicates the datum point has been altered.

A three-dimensional angular cam master of cast meehanite, brass or aluminum is cut and checked on another special machine. The master is mounted in the machine on an arbor, and oriented radially by means of an index plate. The cutting head, operating a spherical carbide milling cutter.

A cradle assembly holds the master cam and swings it into the cutter. This cradle operates through 1350 minutes of arc and is accurate to 0.1 minutes. After the datum points are spotted, the master cam is hand filed in the same manner as the radial cam.

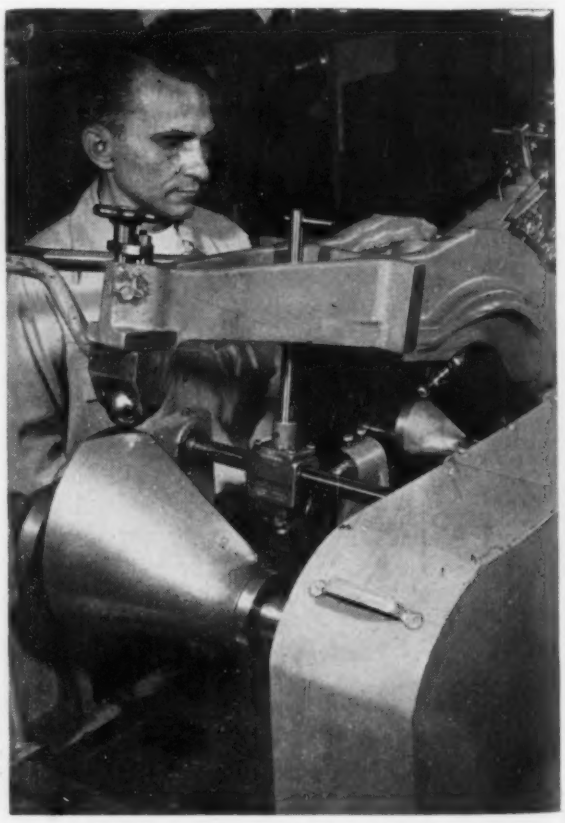
Hand polish 3-D cams

Three-dimensional production cams are also made on a Ford-built duplicating machine. The master cam is mounted on a shaft, and the production cam, previously roughed on a profiler, is mounted on a second shaft geared to the one holding the master cam. A pivoting follower arm carries a spherical tracer and a spherical carbide cutter. To prevent skidding, a parallel linkage holds the follower in a position normal to the master cam axis.

The spherical cutting burr is powered by a variable speed hydraulic motor to provide smooth operation with a minimum of weight on the follower arm. The burr is made to close tolerances and maintains a cutting accuracy of 0.001 in.

The cutting operation is followed by hand polishing to 0.0005 in. accuracy and a final dimensional inspection.

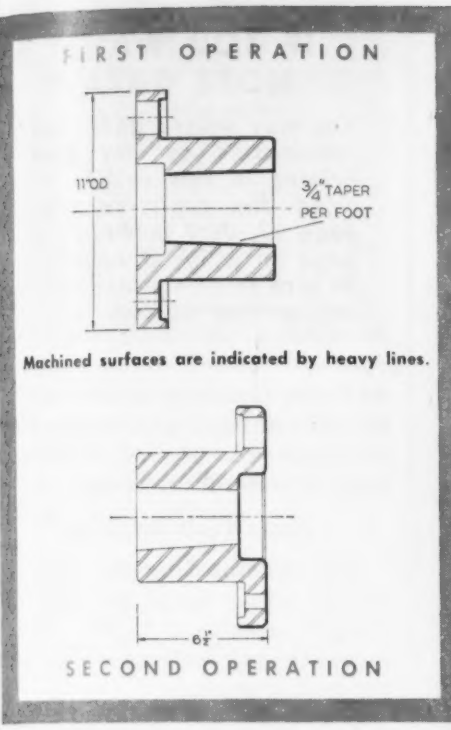
SPECIAL MACHINE makes 3-D master cams, uses instrument (arrow) to check for accuracy.

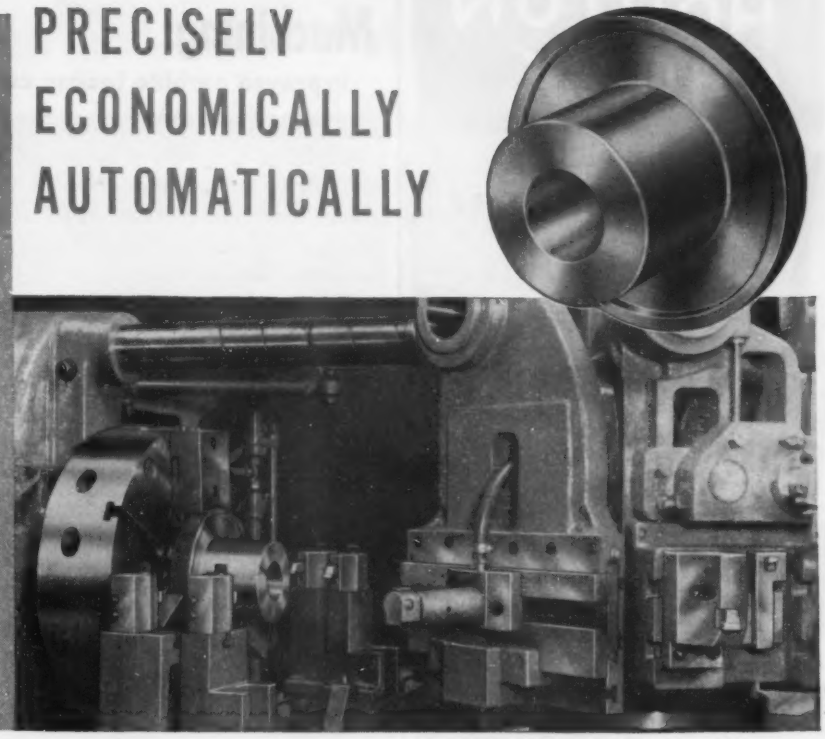


MASTER 3-D CAM and spherical follower, foreground, guides carbide finishing cutter, rear.

How to TAME a TOUGH FORGING

PRECISELY ECONOMICALLY AUTOMATICALLY

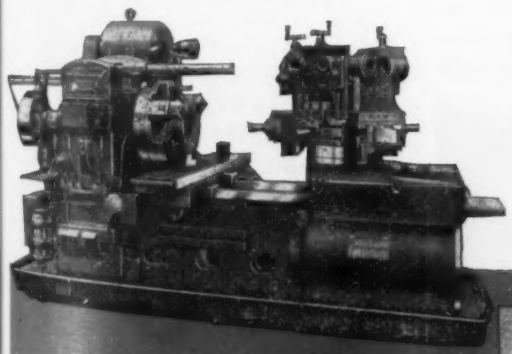




Use the POTTER & JOHNSTON 6-DRE POWER-FLEX

AUTOMATIC TURRET LATHE

This 11" diameter steel forging required power to drill the 3" diameter hole through from the solid and to remove stock rapidly for final precision size turning. The P & J 6 DRE finished the piece in two operations, performing the machining of the tapered bore by using a single-point slide tool. The most effective speeds and feeds for each operation were preselected and automatically repeated. An automatic air-operated chuck increased output with less operator fatigue. More machines were handled by each man.



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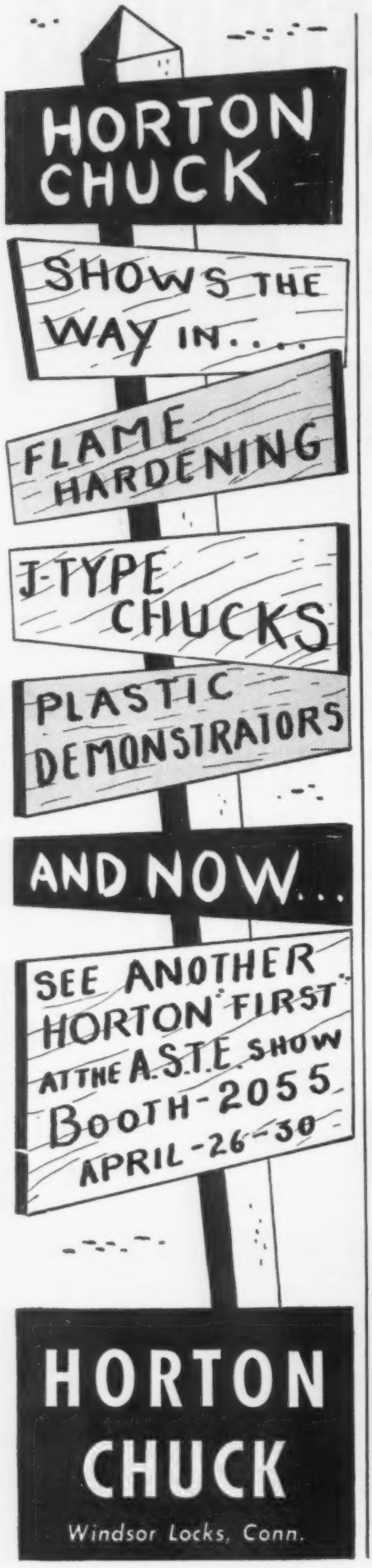
PRECISION PRODUCTION TOOLING FOR OVER FIFTY YEARS



Technical Briefs

Machining:

Improved carbide tooling cuts production costs.

Shifting to a new cutting tool in machining jet engines turbine wheel shafts cut production costs four ways at the Lynn River Works of General Electric Co.

The tool change:

(1) Eliminated the use of a special spring-loaded quill that cost $1500.

(2) Stopped the heat treated steel forging from elongating.

(3) Increased tool life by 40 pct.

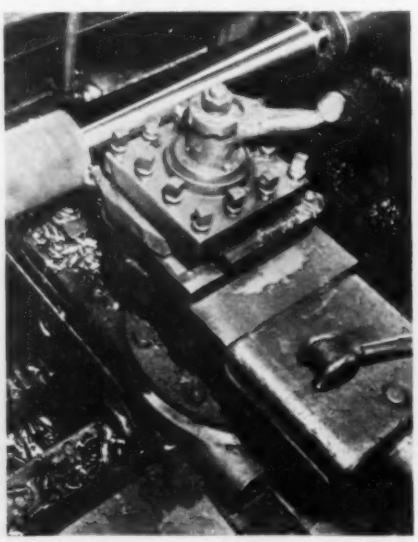
(4) Reduced tool grinding time over 50 pct.

The job at Lynn consisted of machining the J-47 engine part on a 40-hp, 36-in. lathe without coolants. Normal operation called for first rough turning the entire 4340 steel, 5¾-in. diam forging, which was scaly and had a hardness ranging from 269 to 321 Bhn, then repeating the operation with a finishing cut.

One Replaces Two

In the roughing operation, the diameter of the forging was brought down to 4½ in. with the depth of cut in the whole operation varying between ⅜ to ¾-in.

Formerly two cemented carbide cutting tools were employed to complete the job. One was used for roughing, the other for finishing. Now, the whole task is completed with one cemented carbide tool—the new cemented carbide grade 370 developed recently by Carboloy Dept. of General Electric Co.



Finish improved now . . .

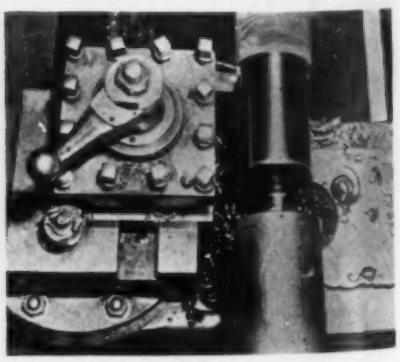
Fewer Tools Required

Heat generated by the previous cutting action caused the shaft to elongate as much as 3/16-in. which caused the ball bearings centered in the quill to seize.

In addition, tool breakage on this job was heavy—about 5 to 6 tools per week at $8 per tool. To counteract this situation, a special spring-loaded quill was devised to keep the work from freezing on center.

With the application of Carboloy carbide grade 370, both red heat in the cutting tools and shaft elongation no longer were problems. Neither was it necessary to depend on a special quill to keep product quality up to specifications.

The carbide tool used includes a chip breaker and operates at a speed of 200 sfpm with a feed of 0.018-in. Even though today the same cutting tool is employed for both roughing and finishing operations, it is running three times as long as the former carbides used—without tip deformation.



. . . In machining setup

IF YOU WANT MORE DATA

You may secure additional information on any item briefed in this section by using the reply card on page 97. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Methods:

Fine platimum wire helps spot films on polished surface.

A tiny platinum wire one-thirtieth as thick as a human hair is being used to find why certain metal surfaces on wires and contacts fail at times to conduct electricity even though physically joined.

Formed into a loop by scientists at the General Electric Research Laboratory, the thin wire can be used to detect finger prints and other films built up by oxidation or tarnishing. Even invisible films can frequently be detected.

Ferrets Out Films

When compressed against a surface, the resilient platinum probe ferrets out films on the most highly buffed and machined surfaces. Measurement of the pressure exerted with a micrometer suggests the type of film present and its electrical strength.

Details about films are studied through measurement of voltage that must be applied through the fine probe in order to break down the film, and by observation of the probing operation through high-powered microscopes.

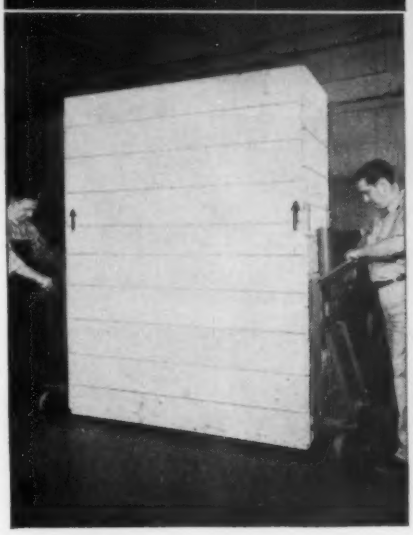
Replaces Other Methods

The probe has been used at times to replace difficult chemical means for analyzing such films. Such chemical techniques, it was pointed out,

Fine wire finds films . . .

Turn Page

Question: **is there a difference between these two shipping containers?**

Ordinary Crate	General Engineered Container
	

Answer: **There is . . . and it was worth $8,000 a year to The Foxboro Company!**

. . . and the difference is General Container Engineering. Both containers hold a 925-lb. instrument cabinet. Both *protect* its precision instruments and satin finish during handling and shipment. Yet the one on the left weighs 400 lb. empty, takes two men and six man-hours to pack. While the General Engineered Container on the right weighs only 170 lb., can be packed by one man in just an hour and a half—*costs 42% less* than the container on the left.

This outstanding dollar saving is the result of painstaking work in well-equipped packaging laboratories—where each container is designed and tested to fit the needs of each product—perfectly. You can get this service without charge, and without obligation. Write for details. And send for your free copy of "The General Box." It's loaded with cost-saving packaging ideas.

ENGINEERED CONTAINERS FOR EVERY SHIPPING NEED

Factories: Cincinnati, Denville, N.J.; East St. Louis; Detroit; Kansas City; Louisville; Milwaukee; Prescott, Ark.; Sheboygan; Winchendon, Mass.; General Box Company of Mississippi, Meridian, Miss.; Continental Box Company, Inc., Houston.

General Box

GENERAL BOX COMPANY, 1873 MINER STREET, DES PLAINES, ILL.

★ ★ ★ ★ ★

HOW WOULD YOU

Solve it?

1 PRODUCTION PROBLEM: To cut unit costs of polishing aluminum street lighting standards. Pfaff & Kendall, Inc., was finishing one 30-foot pole per hour by hand sanding its entire length as it rotated in a lathe bed.

2 SOLUTION: A 3M Representative suggested that this Newark, N.J. manufacturer switch to the 3M Method using Three-M-ite Resin Bond belts installed on two swing grinders mounted in tandem. Poles were rotated in the lathe bed as before. Grinding was done *behind* the contact wheel on the unsupported belt.

3 RESULTS: An immediate production increase from 1 to 4 finished standards per hour, with a higher quality finish. Each belt finishes 10 or 11 poles, with far less operator fatigue. A 3M Representative can help *you* solve your grinding problems, too. His services are available without cost or obligation. Send coupon for facts.

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often destroy or damage the surface, while the delicate probe does not affect it.

Early studies already have detected insulating films on many electrical contacts that otherwise might continue to plague technicians working with them.

The tiny loop recently helped scientists at the laboratory to detect permanent high-resistant areas on silver contacts that had been polished with a high-speed buffer.

They found that the same surfaces, when machined, developed only temporary insulating films which could be removed with solvents.

Plastics:

British need molding capacity, more product applications.

"We're today in the position you Americans were 5 years ago. We're just beginning to find out what can be done with reinforced plastics. We can get our hands on the raw material, but we've yet got to find more fabricators who can produce reinforced plastic moldings in quantity, and more industrial design engineers who can spot applications for the material."

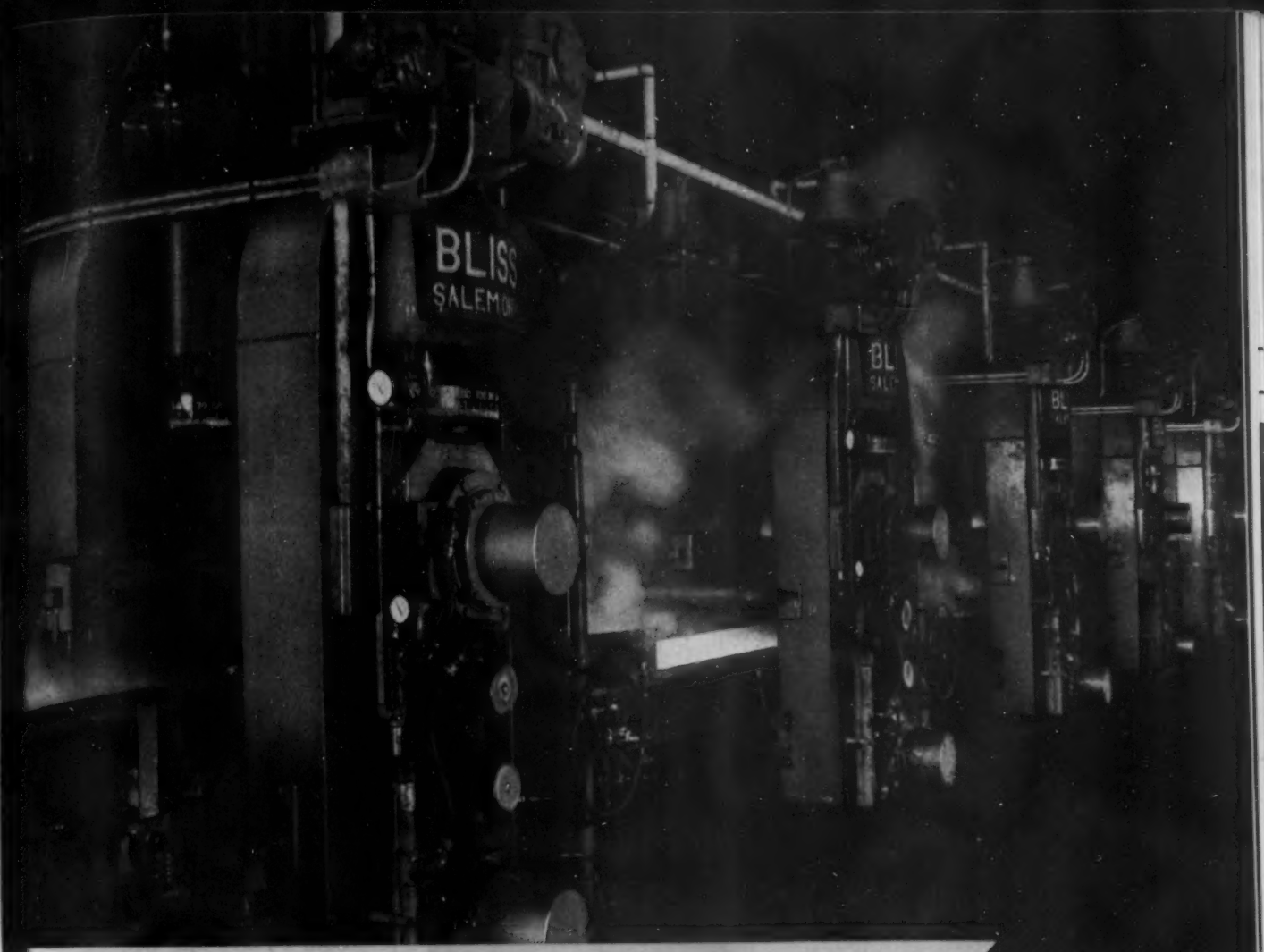
The speaker was an Englishman attending the recent Society of the Plastics Institute meeting at Chicago. He, and representatives from at least seven foreign nations, were an indication of the eager interest of Europe in the skyrocket growth of reinforced plastics in the U. S.

British Use Triples

Though the visitor was modest about English accomplishments in the field of plastics, there's every indication that thus far Great Britain has a substantial lead in plastics development among other Free World nations.

English visitors at the SPI meeting estimated that Great Britain's use of resins reinforced with fiber glass has tripled each year since 1951, when there was just beginning to be some noticeable activity, and that about 200 tons of

Turn Page



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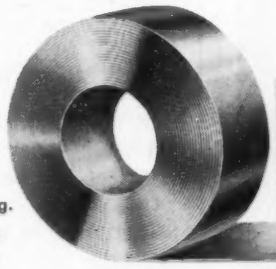

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5225 Wilshire Boulevard

NEW YORK 17, N.Y.
6408 Chrysler Building

PITTSBURGH, PA.
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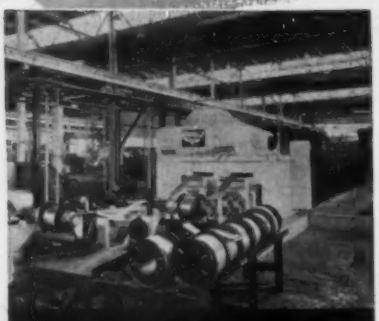
(Carnegie)

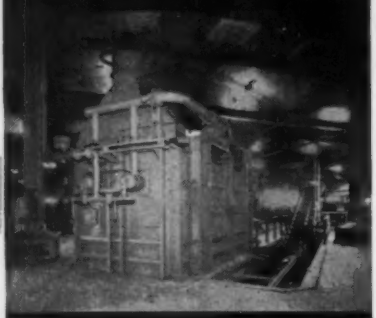
The over-all job in

Production Lines and Special Automatic Machines *by* CONTINENTAL

for military production...

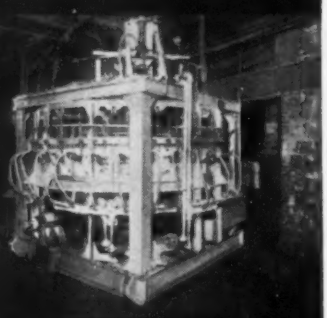


Continental Automatic Strip Production Line consisting of annealer, pickling machine, dryer, and coiler.



Continental Special Automatic Pig Molding Machine complete with automatic charging, melting, and pouring.

Continental Automatic Production Line operating from raw materials to completely finished and packed product. This production line consists of fifteen integrated, synchronized, special automatic machines.



Continental Special Automatic Glazing Machine complete with automatic press synchronizer and fire polisher.

For maximum production of military items manual operations must be eliminated. With CONTINENTAL Special Automatic Machines and Integrated Production Lines production goes on in a continuous flow with better, more uniform products with a minimum of man hours.

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MANUFACTURERS—ENGINEERS—CONTRACTORS FOR OVER A QUARTER OF A CENTURY

glass fiber went into reinforced plastics there in 1953. For 1954 the projected increase is slightly less, but should at least double the 1953 figure.

Biggest user thus far has been the aircraft industry, followed by corrugated sheet, and currently producers of small boats are going after larger amounts of reinforced plastic. Though none of England's large auto producers, Austin, MG, or Ford, have produced any plastic car bodies as yet, there are about 20 small automotive firms and some of these have been making up custom plastic bodies on order. Bus companies, which are using large reinforced plastic moldings on bus bodies as an aluminum substitute, have been sturdy consumers.

Use Plastic in Planes

Overall, it has been estimated that about 50 pct of the reinforced plastic produced there has gone to the aircraft industry, and aircraft buying of the material is expanding at present.

Both France and Belgium have shown some interest, are doing some talking, but there is little actual production at present. France has been using some reinforced plastics in at least two military plane models, but commercial output is low. At least one Belgium firm indicated interest in reinforced plastic piping, and may be considering some type of licensing arrangement.

What is true of France is equally true of Germany, though German commericial development has been further hampered by the ban on aircraft production. Aircraft industry, both in the U. S. and in Great Britain, was a considerable source of encouragement in the early stages of plastics development and still is a very respectable source of business.

More Raw Materials

German output includes some containers, a few refrigerator parts, and plastic window trim. Truck tanks, boats, and a few applications are available from testing labs, but there have not been

European countries show wide interest in development of plastics here.

any strong nibbles thus far from prospective fabricators of these items. Resin can be obtained from several sources, and at least one supplier of premix (resin with inert filler added) is expected to appear soon.

Fiber glass mat, along with the previously available fabrics, is now obtainable. The increasing availability of these raw materials, coupled with developmental and educational work being conducted by resin firms there, should spur reinforced plastics use in Germany this year.

Sweden is utilizing reinforced plastic in several small pipe and electrical sheet applications, Norway is interested in boats of that material, but commercial production is in the initial stages. The fact remains, Europe wants to know and they're willing to pay air fares to the U. S. to find out what's going on in reinforced plastics.

Instruments:

Thermostat developed by NBS is sensitive, flexible, stable.

A versatile electronic thermostat developed by the National Bureau of Standards provides sensitivity, stability and flexibility. In a typical application the thermostat has held standard electric cells, immersed in oil, to a controlled temperature of 28°C within ±0.001°C for many months. Used in a small electric furnace, temperature in the heated-air oven was maintained within ± 0.1°C over a range from 250° to 450°C.

A versatile electronic thermostat is now in use at the National Bureau of Standards as a general-purpose temperature controller for a variety of applications. The instrument is designed for flexibility, high sensitivity, and provides precision temperature control over a wide range of temperature and power requirements.

Turn Page

To save time and money on material handling jobs, investigate the many advantages offered you by a Bucyrus-Erie 22-B crawler crane. Universally accepted as standard equipment for material handling on construction jobs, it can do the same A-1 job around your plants, warehouses and storage areas. Here's why:

High Maneuverability lets the 22-B work anywhere you want it, whenever you want it. It's quickly, easily moved from one job to another.

Independent Boom Hoist permits boom angle to be changed while machine is swinging or propelling, while load is being hoisted or lowered.

Accurate Reliable Boom Control with both raising and lowering full power-controlled by one lever makes it easy to maintain fast operation. A friction clutch on front drum shaft controls hoisting with speed governed by engine throttle. And, an automatic silent ratchet pawl prevents boom from lowering faster than front drum shaft is turning with consequent light service on brake.

Open-Throated Boom makes it easy to rig for 2, 3, or 4 parts of line without taking off sheave guards.

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Quickly convertible to dragline, clamshell, shovel or dragshovel, the 22-B has many additional applications around your property that will mean added savings for you.

Write for complete information today.

BUCYRUS-ERIE COMPANY

SOUTH MILWAUKEE • WISCONSIN

Power supplied to the heating element is switched on and off . . . Controlled cycle can meet many needs . . .

Features include: (1) No appreciable dead zone; (2) high sensitivity without objectionable loss of stability, reducing the deviation from the control point to a minimum with any load changes; (3) capability of handling power requirements ranging from milliwatts to kilowatts for control; (4) use of sensing elements which may be a resistance thermometer or a thermistor connected in a bridge circuit, or a thremocouple connected to a chopper circuit; and (5) the use of standard commercial components.

Principle Used

The thermostat utilizes a principle in which power supplied to the heating element is switched on and off in a regular cycle. The fraction of the cycle during which the power remains on is proportional to the deviation from the desired temperature.

The temperature sensing element—usually a resistance thermometer or thermistor—is connected in one arm of an alternating-current bridge. The adjacent arm of the bridge is a variable resistor adjustable to the desired temperature control point.

Signal Error Amplified

A 164-cps oscillator energizes the bridge and also supplies synchronizing voltage to a twin-diode synchronous detector. When the actual temperature at the sensing element deviates from the control temperature, the resulting bridge error signal is amplified and applied to the center leg of the synchronous detector. The resulting current in the center leg is determined by the amplitude and phase of the error voltage being zero when the error voltage is zero.

Also applied to the detector, in series with the error voltage, is a voltage from a sawtooth oscillator. The result is that the output of the detector consists of a sawtooth voltage that operates about a reference level which varies with the error voltage. This detector output is applied to a Schmitt trigger circuit, which in turn actuates a relay that switches the power applied to the control heater.

Voltage Adjustable

With this arrangement the sawtooth voltage applied to the detector can be adjusted so that, when the temperature deviation and the error voltage are zero, the control relay applies power to the heater 50 pct of the time.

Any temperature deviation from the control point then alters the proportion of the "duty cycle" during which power is applied to the heater, this proportion varies above or below 50 pct depending on the magnitude and direction of the temperature deviation.

Power Is On or Off

Large temperature deviations, beyond the proportional control range for which the instrument is set, result in the heater power being either on or off continuously—depending on the direction of the deviation—until the temperature is again brought within the proportional range.

The duty cycle determined by the frequency of the sawtooth oscillator, is designed to be adjustable over a range of about 5 to 15 seconds to meet the needs of any particular controlled process.

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RIVETER DIES
Made of highest standards and uniform quality thus insuring maximum service. Since 1903
Large inventory of stock sizes of round punches and dies, also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.
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Courtesy Ford Instrument Co.

Assembling computers . . .

—Technical Briefs—

New Books:

Management and engineering data help solve new problems.

"Tax Shelter In Business," by W. J. Casey and J. K. Lasser. Presents strategies business management uses to maintain a favorable position in the face of today's tax structure. Management policies are judged as they are reflected in more or less advantageous tax payments. Business Reports, Inc., 1 Main St., Roslyn, N. Y. $12.50. 156 p.

"The Science of Precision Measurement." Greatly expanded use of precision measurement during the past 20 years has brought a multiplicity of new instruments. Here is a thorough text on the fundamentals of precision inspection techniques necessary for modern quality control. The DoAll Co., Des Plaines, Ill. $3.50. 258 p.

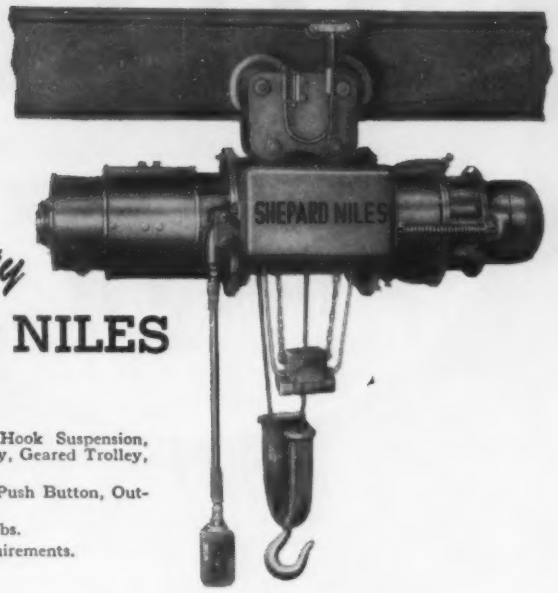
"Flow and Fan," by C. Harold Berry. Text for student as well as the practicing engineer. Book covers the elements of fan selection and control, duct arrangement and resistance, and system characteristics and flow analysis. The Industrial Press, 148 Lafayette St., New York 13. $4.00. 226 p.

British Fair to Show Plastics

Fish lines and marine tow ropes, filter cloths and acid-resistant clothes, pickling tanks and instrument cabinets are some of the diverse industrial uses of plastics that visitors to the British Industries Fair will see demonstrated.

Fair will be held May 3-14 in London and Birmingham. Among exhibits will be both industrial and consumer products utilizing some form of plastic or made entirely of plastic. Electrical, chemical and automotive industries will be represented along with several others.

Choose the hoist *that* fits the job!

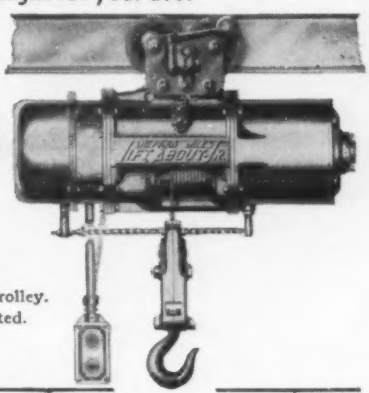


Heavy Duty
SHEPARD NILES Hoist

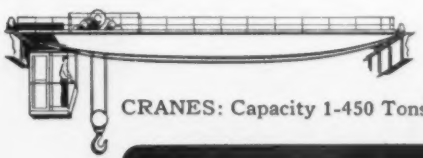
Types: Lug Suspension, Hook Suspension, Base Type, Push Trolley, Geared Trolley, Motor-driven Trolley.
Controls: Pendant Rope, Push Button, Outrig, Remote.
Capacities: 500 to 40,000 lbs.
Speeds: To meet your requirements.

IT PAYS to choose the right hoist for your lifting job . . . the wrong choice can be costly! Let a Shepard Niles representative guide you in selecting the hoist that best suits your needs. He's a specialist in through-the-air handling . . . knows which model, capacity and controls will be right for your use.

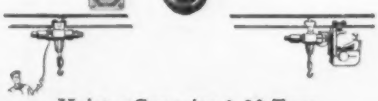
Light Service
SHEPARD NILES
LIFT ABOUT-JR.



Types: Lug Suspension, Hook Suspension, Push Trolley.
Controls: Single Speed, Push Button, Rope Operated.
Capacities: 250, 500, 1000, 2000 lbs.



CRANES: Capacity 1-450 Tons



Hoists: Capacity 1-20 Tons

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CRANE AND HOIST CORPORATION

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● Noon or midnight the loading area of this Ryerson plant looks much the same because we work 'round the clock to make sure that you get Ryerson Steel when you need it. Carbon steel, alloy steel, stainless—every kind is on hand, in practically every shape and size. Your requirements can be set down where you want them, quickly, cut to size and ready for immediate use. Just call the nearest Ryerson plant.

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RYERSON

THE IRON AGE SUMMARY...

- **Steel balance may be tipped in next 60 days**
- **Scrap prices rise for fourth week in a row**
- **But ingot rate slips half a point to 67.5.**

The next 60 days will probably go a long way toward shaping the course of the steel market in 1954. Depending on how things go during this crucial period the balance for the entire year might be shifted up or down.

First quarter decline has been arrested, and in recent weeks producers have even been able to work off much of their semi-finished stocks while holding the ingot rate steady. This means the market is in fair balance at a little over two-thirds of rated capacity.

A check of the market by THE IRON AGE this week again shows no significant improvement in business, and none in immediate prospect. But there are some signs that the steel market climate is improving.

(1) Overall economic activity is steadying, although on a lower plane than peak 1953.

(2) Inventory corrections are slowly becoming less of a factor, even though they will continue a potent influence for some time.

(3) Labor negotiations in the next 2 months, with obvious possibility of strike, are expected to convert a lot of steel users to a buying mood. The union is aware of possible market stiffening, and is holding off final demands in the hope its economic hand might be strengthened.

These positive factors make it a good bet that the next significant move in the steel market will be upward.

But the pickup will probably be moderate; no sharp improvement in demand can be expected on the basis of current prospects. Yet a sudden darkening of the labor picture could change all that.

A check of individual steel consuming industries yields both positive and negative results:

Luke-warm auto demand has been a bitter disappointment to some, failing to add steam to the market. Although this is steel's No. 1 customer, its stimulating influence was probably overrated early this year.

Appliance business is blowing hot and cold, with little overall direction. Air conditioning, radio, and TV will probably beat early estimates. But some usually good customers are still virtually out of the market for steel.

Farm equipment business is surprisingly good. New models are helping sales, and employment is up. Significantly, little companies report for the first time in months they are able to move inventories of finished equipment.

Tinplate demand has improved, partly on the basis of strike-hedge buying. Some canners were caught with their inventories down during the 1952 steel strike. They haven't forgotten those hectic days when some crops were threatened with spoilage for lack of containers.

Railroad demand is weak and carbuilders' requirements are still sinking. Demand for structural products continues good.

Scrap prices advanced this week for the fourth consecutive week. THE IRON AGE Steel Scrap Composite Price rose 67¢ a ton to $25.17 per gross ton.

Steelmaking operations are scheduled half a point lower at 67.5 pct of rated capacity.

Steel Output, Operating Rates

	This Week†	Last Week	Month Ago	Year Ago
Net Tons Produced (000 omitted)	1,604	1,622	1,613	2,228
Ingot Production Index (1947—49=100)	99.9	101.0	100.4	138.7
District Operating Rates				
Chicago	74.0	72.5	78.0	106.0
Pittsburgh	70.0	73.0	74.0	98.0
Philadelphia	60.0	59.5	65.0	94.0
Valley	60.0	63.0*	61.0	94.0
West	75.0	76.0	76.0	104.0
Detroit	72.0	70.0	79.0	108.0
Buffalo	67.5	67.5	69.5	94.0
Cleveland	64.5	63.0*	58.0	97.0
Birmingham	46.0	77.0	78.5	101.0
S. Ohio River	75.0	75.0	76.0	86.0
Wheeling	79.0	82.0*	83.0	102.0
St. Louis	62.5	62.0	43.5	71.0
East	51.5	31.0	51.5	96.0
Aggregate	**67.5**	**68.0**	**68.0**	**99.0**

Per cent of capacity for weeks in 1954 is based on annual capacity of 124,330,410 net tons as of Jan. 1, 1954. Per cent of capacity for last year is based on annual capacity of 117,547,470 tons as of Jan. 1, 1953.

* Revised.

† Tentative.

STEEL OUTLOOK — STEEL OUTLOOK — STEEL OUTLOOK — STEEL OUTLOOK

New ideas are better ideas when they employ **STAINLESS STEEL**

Write for Your Copy

ALLEGHENY METAL IN THE DAIRY INDUSTRY

One of the Allegheny Ludlum "Industry Book" series—36 pages of useful information on the uses of Allegheny Metal in dairy and milk-product plant equipment, also data on fabrication methods. Similar booklets on other industries: chemical, petroleum, food, hospital, paper, etc., are available.

ADDRESS DEPT. A-521

Ex-cell-o Corporation's "Pure-Pak" container is a mighty popular milk package. Dairies in every state are using it to the tune of more than a half-billion monthly.

But Ex-cell-o improved it, just the same . . . designed a container that opens out to pour like a pitcher. Now the dairies that use Pure-Pak Containers will find the convenience of their customers better served. And as always, the need for complete cleanliness is better served by the use of stainless steel in all parts of Pure-Pak milk packaging machines coming in direct contact with the milk, or exposed to large amounts of water in cleaning.

In *your* business, wherever easy, low-cost sanitation and the purity of products are prime factors—or wherever good looks, long life, great strength, or top resistance to corrosion and heat are vital to you—that's the place to use Allegheny Metal, the time-tested stainless steel. Let us work with you. *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

You can make it **BETTER** with

Allegheny Metal

Warehouse stocks carried by all Ryerson plants

AL® TIME-TESTED STAINLESS STEEL

WSD 4974

Markets at a Glance

May Sheet Orders Down . . . Market checks show that order entries on sheet steel for May delivery are lower than April. Hot-rolled buyers may still get on the books up to May 1, cold-rolled users a week sooner, so there's still a chance for a last minute pickup.

Wire Pickup . . . Wire business continues to pick up to such an extent it has surprised some producers. Agricultural demand, holding well, is the biggest surprise. Yet mills are having a hard time convincing jobbers they should carry more than hand-to-mouth inventory.

Order Uranium Furnaces . . . General Electric Company has received a $1.4 million order from England's Ministry of Supply for furnaces and furnace pots to be used in production of purified uranium metal. The order consists of 54 electric vertical cylinder furnaces, each rated at 100 kw, and 200 furnace pots.

See Ingot Rate Rise . . . Western steel producers last week indicated that if metalworking firms began resumption of normal ordering within the next 30 days, the western ingot rate would climb 10 pct by June. Output of four largest western producers last week hit 75.8 pct and this week is scheduled at 74.7 pct.

Pittsburgh More Active . . . Business in the Pittsburgh district moved upward slightly in the week ended Apr. 3 following a decided slump during March. The rise was largely seasonal, according to University of Pittsburgh. Index of business activity rose from 147.2 in the week ended Mar. 27 to 154.4. It was 160.0 at start of March and 168.8 at beginning of February.

Break Ingot Record . . . A monthly ingot production record was broken last month at the Warren, Ohio, plant of Republic Steel Corp. when the installation's eight openhearth furnaces turned out 88,131 net tons of steel. Previous monthly record of 87,667 tons was set in October, 1942.

Electrical Steel Easy . . . Demand for silicon steel continues in the doldrums—with the exception of grain-oriented, which is strong. Outlook is that the picture will remain unchanged at least through second quarter. Appliance and TV manufacturers are still largely out of the market.

Cut Price of Color TV . . . Admiral Corp. is starting its second shipment of color television sets to distributors at a new suggested list price of $1000, a reduction of $175. Admiral's plan for handling warranty and servicing of color sets calls for a 1-year policy covering warranty on parts and all tubes plus unlimited service at a cost of $150.

Tax Writeoff for U. S. Steel . . . Certificates of necessity for accelerated tax amortization were granted to U. S. Steel Corp. A total of $15,925,000 with 45 pct for amortization was allowed on Corporation's Joliet, Ill., metallurgical by-product coke facilities, and $12,930,000 with 50 pct allowed for National Tube Div.'s Lorain, Ohio, by-product coke facilities.

Slight Warehouse Pickup . . . Seattle steel warehouse business is off about 20 pct from last year, but is picking up gradually. Warehousemen say they are "quoting" a high volume of jobs indicating good volume of work, but return to normal is not expected before fall.

More Foundry Equipment . . . Orders of new foundry equipment for Feb. 1954 of $1,422,596 represent a 2 pct increase over the same period in 1953 when orders totaled $1,388,284, reports Foundry Equipment Manufacturers Assn.

New Extra . . . U. S. Steel Corp. announced a new extra of $40 per ton applicable to hot-rolled bars in rounds, squares and round cornered squares over 8 to 9-in. inclusive. Effective date was Mar. 29.

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	4.634	4.634	4.634	4.376
Pig Iron (gross ton)	$56.59	$56.59	$56.59	$55.26
Scrap, No. 1 hvy (gross ton)	$25.17	$24.50	$23.33	$42.75
Nonferrous				
Aluminum, ingot	21.50	21.50	21.50	20.50
Copper, electrolytic	30.00	29.875	29.875	31.00
Lead, St. Louis	13.80	13.55	12.80	12.80
Magnesium, ingot	27.75	27.75	27.75	27.00
Nickel, electrolytic	63.08	63.08	63.08	63.08
Tin, Straits, N. Y.	$1.01	94.50	92.50	98.50
Zinc, E. St. Louis	10.25	10.25	9.75	11.00

Expect Thumbs Down on Bolivian Tin

State Dept. rejection of Bolivian tin extension seen . . . Obstacles include Administration position on Texas City smelter and U. S. tin surplus—*By R. L. Hatschek.*

Washington sources report that it now appears almost certain that State Dept. will reject the recent proposal that the U. S. renew its contract to buy Bolivian tin.

Bolivian ambassador Victor Andrade has been urging a 1-year extension of the agreement, under which the U. S. bought 10,000 tons of ores and concentrates in the year ended Mar. 31. The Bolivians are anxious to get an American commitment to buy an additional 15,000 to 20,000 tons of tin.

"Serious Obstacles". . . Mr. Andrade conferred last week with Henry F. Holland, Assistant Secretary of State for Inter-American Affairs, and said later he was told there were "serious obstacles" to extension of the contract.

The matter is tied in with future congressional action concerning the tin smelter at Texas City, Tex. The Administration's view is that the smelter should be closed.

Another difficulty involving the Bolivian proposal is the existence of current stocks of U.S.-owned tin far in excess of stockpile needs. Amount of this surplus is now 40,000 tons, but that figure is expected to grow to 60,000 tons as this country continues its tin purchases from Indonesia for another year.

ALUMINUM SHIPMENTS

(Net Tons)

	Feb.	Dec.
Sheet & Plate, total	34,092	35,723*
Non-Heat-Treatable	25,653	25,709*
Heat-Treatable	8,438	10,014*
Foil	5,546	5,213
Extruded Products, total	8,793	9,742*
Soft Alloys	6,529	6,967
Hard Alloys	2,265	3,062
Tube, Drawn, total	2,585	2,867
Soft Alloys	2,190	2,455
Hard Alloys	395	412
Rod & Bar, Rolled	5,908	5,411
ACSR & Cable, Bare	4,323	4,177
Wire, Other than Conductor	1,269	1,253
Forgings	2,151	1,955*
Castings, total	12,256	12,128*
Sand	1,048	1,140*
Permanent Mold	5,582	5,424*
Die	5,626	5,524*

* Revised.

Stockpile Question . . . The "new look" stockpile program, called for by the President, with its higher goals for a number of metals, may absorb this surplus. While the actual list of metals hasn't been divulged, tin is said to be on it.

Also on the secret list is the degree the stockpile is to be expanded. It's entirely possible that the coming 60,000-ton tin surplus —a full year's supply—would be absorbed with room to spare. Or it might be plenty.

Asks Stockpile Boost . . . There's no doubt that aluminum stockpiling will be increased in following up the Administration's new policy. But Frank R. Nichols, president of Nichols Wire & Aluminum Co., came out last week urging accelerated stockpiling and asked a green light for a third round of primary aluminum expansion (See THE IRON AGE, Apr. 8, p. 186).

He stressed three points: (1) Increasing importance of air transportation and the air transportability of military equipment; (2) vulnerability of domestic reduction plants to enemy action; and (3) chaos created by attempting to build up stocks in periods of high aluminum demand.

Shipments Even Out . . . February shipment statistics of the Aluminum Assn. stand about on a par with January. Only categories that slipped were sheet and plate, extrusions, and drawn tube. Considering the fact that February is a short month, these declines are washed out except for tube and some subcategories.

Foil shipments, however, hit a new record during the month. Total was 5546 tons shipped in February.

Zinc Stocks Rise . . . Contrary to all predictions, stocks of slab zinc held by smelters in the U. S. increased during March. But the increase was a small one—1177 tons, about the same as last month's rise. This nudged the total to 201,171 tons.

Most of the March statistics reported by the American Zinc Institute are encouraging. Production of 71,186 tons very nearly matched shipments. On a daily average basis, output was below February's.

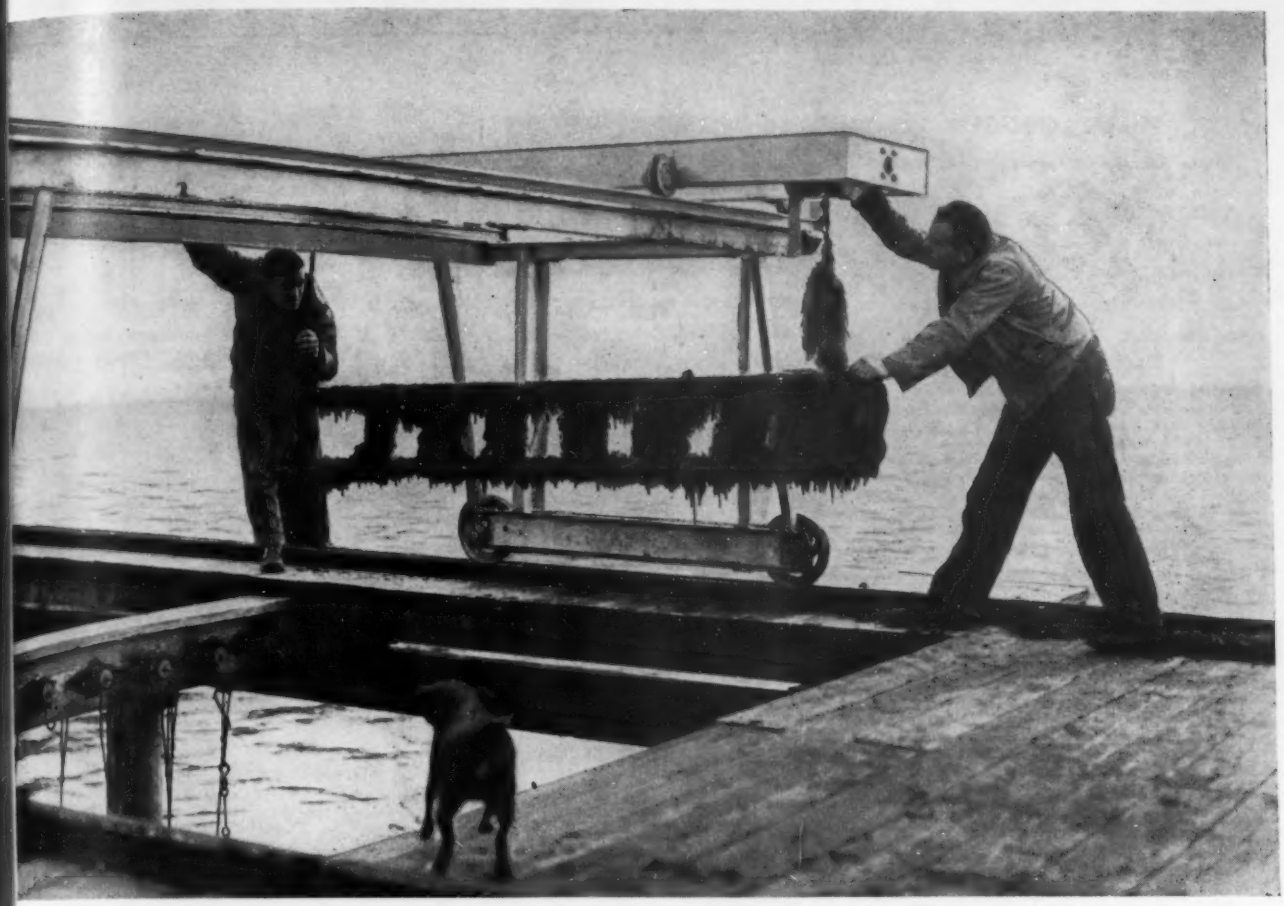
Worst feature was a 5500-ton plunge in exports, but this category fluctuates violently by its very nature. Brightest aspect was the 8916-ton increase in unfilled orders. At the beginning of April these stood at 37,209 tons, highest since the end of last June.

NONFERROUS METAL PRICES

(Cents per lb except as noted)

	Apr. 7	Apr. 8	Apr. 9	Apr. 10	Apr. 12	Apr. 13
Copper, electro, Conn.	29.75–30.00	29.75–30.00	30.00	30.00	30.00	30.00
Copper, Lake delivered	30.00	30.00	30.00	30.00	30.00	30.00
Tin, Straits, New York	94.50	95.00	97.00	....	$1.01	$1.01*
Zinc, East St. Louis	10.25	10.25	10.25	10.25	10.25	10.25
Lead, St. Louis	13.55	13.55	13.55	13.55	13.80	13.80

Note: Quotations are going prices
*Tentative



FOR EIGHTEEN YEARS and through thousands of tests, engineers have been seeking the answer to the question . . .

How hard can the sea bite?

When that question was asked about a material, the answer seemed easy to get. Almost *too* easy.

All that engineers did at first was to add salt to water to get the same saltiness as sea water. Then dunk a sample long enough to find out what would happen.

That *was* easy. But it *was not* the right answer. No one really knew how corrosive natural sea water could be . . . with its multitude of dissolved chemicals, its changing temperatures, its tides and currents, its living organisms and abrasive sands.

Right answers are available now, though. For during the last 18 years Inco Corrosion Engineers have tested various effects of real sea water on some 35,000 specimens. Working at seaside testing stations, they have run tests on many materials in salty atmosphere. Or in live sea water. Or exposed to both alternately, through tidal action. They've studied the effects that velocity, marine growth and methods of coupling have on the deterioration of many metals.

If you're troubled by a problem arising from the sea around us, there is a chance that Inco engineers may already have the basis for an answer from their studies at the Kure Beach Corrosion Testing Station.

But, of course, yours may not be a marine problem. You may be much more interested in corrosion of some other sort: atmospheric, chemical, high temperature, or the *effect* of metallic breakdown on the quality of products being processed.

Whatever your particular corrosion "headache," the cure may be already available in Inco's mass of catalogued data on the behavior of metals under all kinds of conditions. The answer may well be an Inco Nickel Alloy. If no immediate answer is indicated, special investigation may be initiated to provide one. A special series of tests might be run for you . . . tests of *any* sort.

It's our job to help metals perform better. Why not write us in detail about your own problem? Better still, ask for one of our Corrosion Data Work Sheets to assist you in presenting your problem easily. Address The International Nickel Company, Inc., 67 Wall St., New York 5, N. Y.

Inco Nickel Alloys

INCO

MONEL® • "R"®MONEL • "K"® MONEL • "KR"® MONEL • "S"® MONEL
INCONEL® • INCONEL "X"® • INCONEL "W"® • INCOLOY® • NIMONIC® Alloys
NICKEL • LOW CARBON NICKEL • DURANICKEL®

Nonferrous Prices

(Effective Apr. 13, 1954)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.136 in. and thicker, 2S, 3S, 33.9¢; 4S, 36.0¢; 52S, 38.2¢; 24S-O, 24S-OAL, 37.0¢; 75S-O, 75S-OAL, 44.7¢; 0.081-in., 2S, 3S, 35.1¢; 4S, 37.7¢; 52S, 39.9¢; 24S-O, 24S-OAL, 38.4¢; 75S-O, 75S-OAL, 46.9¢; 0.032-in., 2S, 3S, 37.0¢; 4S, 41.8¢; 24S-O, 24S-OAL, 46.9¢; 75S-O, 75S-OAL, 58.4¢.

Plate, ¼-in. and Heavier: 2S-F, 3S-F, 32.4¢; 4S-F, 34.5¢; 52S-F, 36.2¢; 61S-O, 35.6¢; 24S-O, 24S-OAL, 36.9¢; 75S-O, 75S-OAL, 44.3¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.5¢ to 82.8¢; 12 to 14, 37.2¢ to 99.0¢; 24 to 26, 39.9¢ to $1.29; 36 to 38, 47.2¢ to $1.89.

Rod, Rolled: 1.064 to 4.5-in., 2S-F, 3S-F, 43.8¢ to 37.2¢; cold-finished, 0.375 to 3.449-in., 2S-F, 3S-F, 47.6¢ to 39.3¢.

Screw Machine Stock: Rounds, 11S-T3, ½ to 11/32-in., 59.6¢ to 47.0¢; ⅜ to 1½-in., 46.6¢ to 43.8¢; 1 9/16 to 3-in., 42.7¢ to 39.9¢. Base 6000 lb.

Drawn Wire: Coiled 0.051 to 0.374-in., 2S, 44.1¢ to 32.4¢; 52S, 53.4¢ to 39.1¢; 17S-T4, 60.1¢ to 41.8¢; 61S-T4, 53.9¢ to 41.3¢.

Extruded Tubing: Rounds, 63S-T5, OD 1¼ to 2-in., 31.6¢ to 60.7¢; 2 to 4 in., 37.7¢ to 51.1¢; 4 to 6 in., 38.2¢ to 46.6¢; 6 to 9 in., 88.7¢ to 48.8¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42¾ x 60 in., $2.838; x 96 in., $4.543; x 120 in., $5.680; x 144 in., $6.816. Coiled sheet, per lb, 0.019 in. x 28 in., 30.8¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 56¢; 3/16 in., 57¢; ⅛ in., 60¢; 0.064 in., 73¢; 0.032 in., 94¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 77¢; ½ to ⅝ in., 60.5¢; 1¼ to 1.749 in., 56¢; 2½ to 5 in., 51.5¢. Other alloys higher. Base up to ⅝ in. diam, 10,000 lb; ⅝ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft, for perimeters less than size indicated; 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape; Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD, ¼ to 5/16 in., $1.43; 5/16 to ⅝ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall; OD, ⅝ to ¾ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades; Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	86½	67½	92½
Strip, CR	92½	70½	98½
Rod, bar	82½	65½	88½
Angles, HR	82½	65½	88½
Plate, HR	84½	66½	90½
Seamless Tube	115½	100½	137½
Shot, blocks	....	60	....

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	46.41	....	48.48
Copper, h-r	48.38	44.73	....
Copper, drawn	....	45.98	....
Low brass	44.47	44.41	....
Yellow brass	41.72	41.66	....
Red brass	45.44	45.38	....
Naval brass	45.76	40.07	41.33
Leaded brass	....	....	39.11
Com. bronze	46.95	46.89	....
Mang. bronze	49.48	42.62	45.18
Phos. bronze	66.58	67.08	....
Muntz metal	43.96	39.77	41.02
Ni silver, 10 pct	55.36	....	62.63

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	21.50
Aluminum pig	20.00
Antimony, American, Laredo, Tex.	28.50
Beryllium copper, per lb cont'd Be	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	30.00
Copper, Lake, delivered	30.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$165 to $175
Lead, St. Louis	13.80
Lead, New York	14.00
Magnesium 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	27.00
Ingot	27.75
Magnesium, sticks, 100 to 500 lb.	46.00 to 48.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$215 to $218
Nickel electro, f.o.b. N. Y. warehouse	63.08
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	56.25
Palladium, dollars per troy oz.	$21.00
Platinum, dollars per troy oz.	$84 to $87
Silver, New York, cents per oz.	85.25
Tin, New York	$1.01
Titanium, sponge, grade A-1	$4.72
Zinc, East St. Louis	10.25
Zinc, New York	10.75
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered carloads)

85-5-5-5 ingot	
No. 115	26.00
No. 120	25.25
No. 123	24.75
80-10-10 ingot	
No. 305	31.00
No. 315	28.75
88-10-2 ingot	
No. 210	40.75
No. 215	37.25
No. 245	32.25
Yellow ingot	
No. 405	22.25
Manganese bronze	
No. 421	26.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	23.25-24.00
0.60 copper, max.	23.00-23.75
Piston alloys (No. 122 type)	21.00-23.00
No. 12 alum. (No. 2 grade)	20.50-21.00
108 alloy	20.50-21.50
195 alloy	22.00-22.75
13 alloy (0.60 copper max.)	23.00-23.75
ASX-679	20.50-21.50

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—96-97½%	21.50-22.50
Grade 2—92-95%	20.50-21.50
Grade 3—90-92%	19.00-19.50
Grade 4—85-90%	18.00-18.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	44.54
Electrodeposited	38.38
Flat rolled	47.14
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	84.00
Cadmium	$1.75
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn.	94⅛

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63.90
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	30.00
Nickel chloride, 375 lb drum	38.00
Silver cyanide, 100 oz. lots, per oz.	75½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	54.30

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25¼
Yellow brass	19¾	18
Red brass	23	23¼
Comm. bronze	23⅞	23½
Mang. bronze	18¼	17½
Yellow brass rod ends	19½	...

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	26¼—26½
No. 2 copper wire	24¾—25
Light copper	23¼—25
*Refinery brass	21½—22

* Dry copper content.

Ingot Makers' Scrap

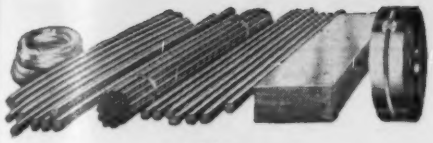
(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	26 —26¼
No. 2 copper wire	24½—24¾
Light copper	23 —23¼
No. 1 composition	19½—20
No. 1 comp. turnings	19 —19½
Rolled brass	16
Brass pipe	17
Radiators	15½
Aluminum	
Mixed old cast.	12½—13
Mixed new clips	14 —14½
Mixed turnings, dry	12½—13½
Pots and pans	12½—13

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

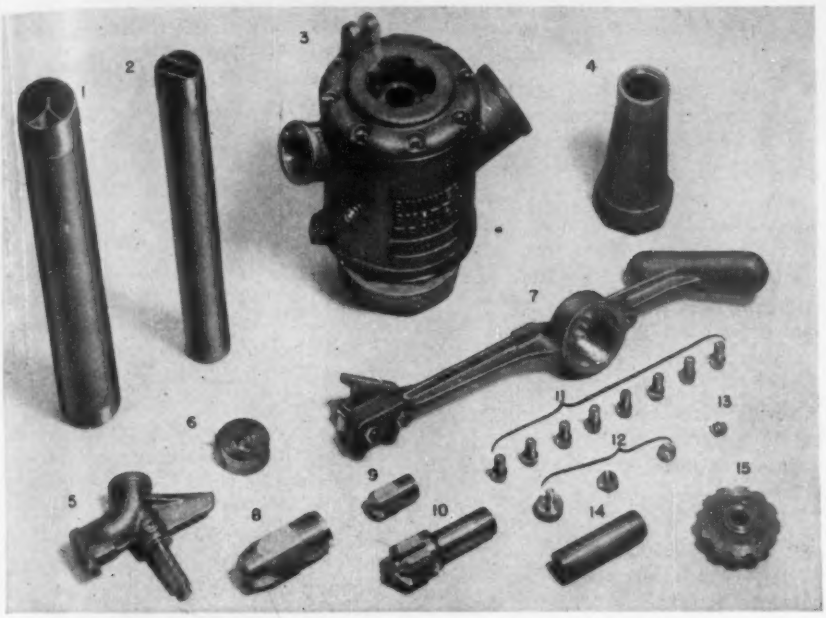
Copper and Brass	
No. 1 heavy copper and wire	24
No. 2 heavy copper and wire	22½—22¾
Light copper	20½—20¾
New type shell cuttings	20¼
Auto radiators (unsweated)	13¼—13⅝
No. 1 composition	17½
No. 1 composition turnings	16½—17
Unlined red car boxes	14¾—15¼
Cocks and faucets	14¾—15¼
Mixed heavy yellow brass	11½—12
Old rolled brass	14 —14½
Brass pipe	16 —16¼
New soft brass clippings	16¾—17¼
Brass rod ends	14¾—15¼
No. 1 brass rod turnings	12¼—12⅝
Aluminum	
Alum. pistons and struts	6 — 7
Aluminum crankcases	9½—10
2S aluminum clippings	12 —12½
Old sheet and utensils	9½—10
Borings and turnings	6 — 7
Misc. cast aluminum	9½—10
Dural clips (24S)	10 —10½
Zinc	
New zinc clippings	5½— 6
Old zinc	4¼— 4½
Zinc routings	2½— 2¾
Old die cast scrap	3½— 3¾
Nickel and Monel	
Pure nickel clippings	60 —65
Clean nickel turnings	40
Nickel anodes	60 —65
Nickel rod ends	60 —65
New Monel clippings	22 —24
Clean Monel turnings	14 —15
Old sheet Monel	20 —22
Nickel silver clippings, mixed	13
Nickel silver turnings, mixed	11
Lead	
Soft scrap lead	10¾—11
Battery plates (dry)	5¾— 6
Batteries, acid free	4¼
Magnesium	
Segregated solids	20 —21
Castings	19 —20
Miscellaneous	
Block tin	65 —70
No. 1 pewter	45 —50
No. 1 auto babbitt	38 —40
Mixed common babbitt	12 —12½
Solder joints	15
Siphon tops	35 —40
Small foundry type	15 —15¼
Monotype	13½—13¾
Lino. and stereotype	12¾—13
Electrotype	11 —11¼
Hand picked type shells	8 — 8¼
Lino. and stereo. dross	5 — 5¼
Electro dross	3½— 3¾



BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

Bridgeport BRASS CO. MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL



Component parts of 5-Star Sprinkler are made from brass, silicon bronze, and phosphor bronze for long, trouble-free service. Courtesy of The Skinner Irrigation Company, Troy, Ohio.

Rainmaking to Order...
A Job for Copper Alloys

The modern way to make fertile acres yield maximum crops is to supply the land with artificial rain—delivering it when and where it is needed and in the proper quantities.

But whether used to meet the vital requirements of field crops, or of lawns, athletic fields, golf courses, and orchards, the sprinklers, valves, couplers and other auxiliary equipment must operate efficiently and reliably under all conditions. They must be strong and tough to take heavy mechanical abuse and must be resistant to corrosive attacks from weather, soil, impurities, and water.

To stand up and deliver long, trouble-free performance in this rugged service, copper-base alloys are the preferred materials. They are universally used for water equipment which covers portable agricultural sprinklers, stationary and pop-up heads for concealed lawn irrigation, or self-closing valves and couplers in hoseless irrigation.

High-Pressure Sprinkler Uses Brass and Bronze

The agricultural sprinkler illustrated above is constructed with practically 100% brass and bronze construction. At 100 lbs. pressure it discharges 400 gallons per minute over an area equal to 2.8 acres.

The body of the sprinkler (3) is a brass casting, as are the main nozzle (4), driving nozzle body (5), impact arm (7), spring housing (15).

The upper bearing which positions the driving nozzle assembly is attached to the body by eight socket-head silicon bronze screws (11). A high-strength, fatigue-resisting alloy is essential at this point in order to bear the brunt of the swinging impact arm which turns the body. Excellent corrosion resistance is an important factor in its selection too, since the screws can easily be removed for periodic cleaning.

Brass for Nozzles and Screws

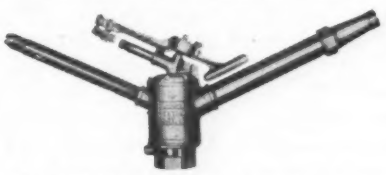
Water entering the body is discharged from three nozzles. The main nozzle arm is made of red brass pipe (1) to which is screwed a cast brass nozzle (4). This delivers an effective, finely broken stream to the outside area. The secondary nozzle arm also made of red brass pipe (2) and a leaded brass nozzle (8) covers the intermediate area. The third nozzle arm (14) is of red brass with a leaded brass nozzle (9) and furnishes the stream which operates the impact arm mechanism, and provides moisture immediately around the sprinkler. Inside nozzle arms (1) and (2) are brass strip rectifiers which minimize turbulent flow of the water.

Nozzles (8 & 9) and slotted driving nozzle body stem (10), as well as the regulating screw, special nut and set screw (12) are made from free-cutting Ledrite brass rod. Bridgeport's Ledrite 6 has a machinability rating of 100 and gives excellent results in screw machine operations.

Phosphor Bronze Controls Rotation

Motivated by a stream of water pushing aside a reversible wedge, the sprinkler circles 360°, step by step. However, the key to the efficiency of the stream coverage lies in the speed of rotation. In the center housing of the impact arm is a spring (6) of Phosphor Bronze Grade A (95% copper and 5% tin), which can be adjusted by increasing or decreasing the tension, thereby controlling the speed of rotation of the sprinkler.

There is also a contact spring (13) which brakes the turning of the sprinkler that is made of phosphor bronze.



5-Star Sprinkler agricultural irrigation systems supply artificial rain in proper quantities when and where it is needed. Courtesy of The Skinner Irrigation Company.

Let Bridgeport Help You

Manufacturers and designers should avail themselves of the Bridgeport laboratory service and the advice of Bridgeport's sales metallurgists in regard to selecting the proper alloy and temper for any specific purpose. Wider use of such alloys as silicon bronze, phosphor bronze and Duronze III (silicon-aluminum bronze) can often improve old products or should be considered when developing new items. Please contact the nearest Bridgeport office for help on your metal requirements. (1363)

Market Strengthening Continues

More districts report price increases for steelmaking, blast furnace grades . . . Up $1 in Chicago, Pittsburgh . . . Valley sale boosts Ohio prices . . . . Composite up 67c

It wasn't exactly sweeping the nation, but there was no mistaking the decided strengthening in the scrap market this week. Some areas were more cautious than others, but important districts showed very real price advances, and there were several complaints about difficulty in filling orders.

Steelmaking grades went up $1 in both Chicago and Pittsburgh, with blast furnace items also advancing. Heavy melting and bundles rose $2 in Cleveland and $4 in Youngstown on the basis of a sale to a Valley consumer. Cincinnati brokers were paying $1 a ton more for most grades. Buffalo reported a definite firming of the market at last week's higher prices.

East Coast districts reported trade optimism, but it hasn't yet shown up in terms of dollars and cents. On the West Coast the reentry of one mill into the market and continuing exports to Japan have had a definite firming effect. Nationally, THE IRON AGE Scrap Composite rose 67¢ to $25.17.

Pittsburgh—Higher prices for railroad scrap moved the market up this week. No. 1 railroad heavy melting rose $2 per ton to $31, top, and other grades advanced in sympathy in absence of actual trading. Blast furnace scrap was stronger. Show of strength here at least partially reflects stronger midwestern market conditions. Starting this week, the Pittsburgh list will include a quotation for cut structurals, 3 ft and under at $32, top. Malleable quotation is being dropped.

Chicago—Market here continues to move strongly with broker buying still setting the pace. But strong prices are now reaching to the dealer level as well. Customer buying continues to be outpaced in many instances by actual mill purchases. Market is predicted for a further increase by many, who are still buying in expectation of a further climb, and estimates of the top range from a low of $2 to a high of $5 over present prices. Cast continues to show great strength and railroad specialities began climbing sharply in a number of grades, even though it's traditionally a rather slow season for rail grades. Rumors of No. 2 dealer bundle sales continue but could not be confirmed at press time.

New York—There's a definite feeling of optimism in the trade here as dealers and brokers watch reports of rising prices in other areas. As yet the optimism hasn't shown up pricewise, but consensus is that any real order would send prices up. Cast continues strong.

Philadelphia — Market here continues with no apparent improvement despite reports of strength in other steel-making districts. Recently noted optimism in the trade is beginning to wither in the absence of any price increases by scrap consumers.

Detroit—Prices cling to their present levels, but with the cautioning word that distress scrap is moving at lower prices. Unless the market tightens, another drop is in sight. Many dealers are trying to stiffen up the market by showing resistance to low offers, but enough are ready to unload to make it an uphill battle. Turnings showed a brief flurry with some buying at higher than quoted prices, but this backfired when shipments were held up. No. 1 grades are moving at today's bargain rates, but secondary grades are practically gone from the market.

Cleveland—Openhearth grades shot up $4 in the Valley and $2 in Cleveland on the basis of a $30 sale of No. 1 heavy melting to a Valley consumer. Increase in Cleveland prices was not in direct proportion since very little scrap is expected to be routed to the Valley. Blast furnace grades inched up from 50¢ to $1 in the Cleveland area.

Birmingham—Southern mills purchased additional steel scrap this week for April delivery, although the March purchases have not been completely filled. Dealers are continuing to resist prices offered in the district. Some scrap was moving north by barge, particularly from New Orleans.

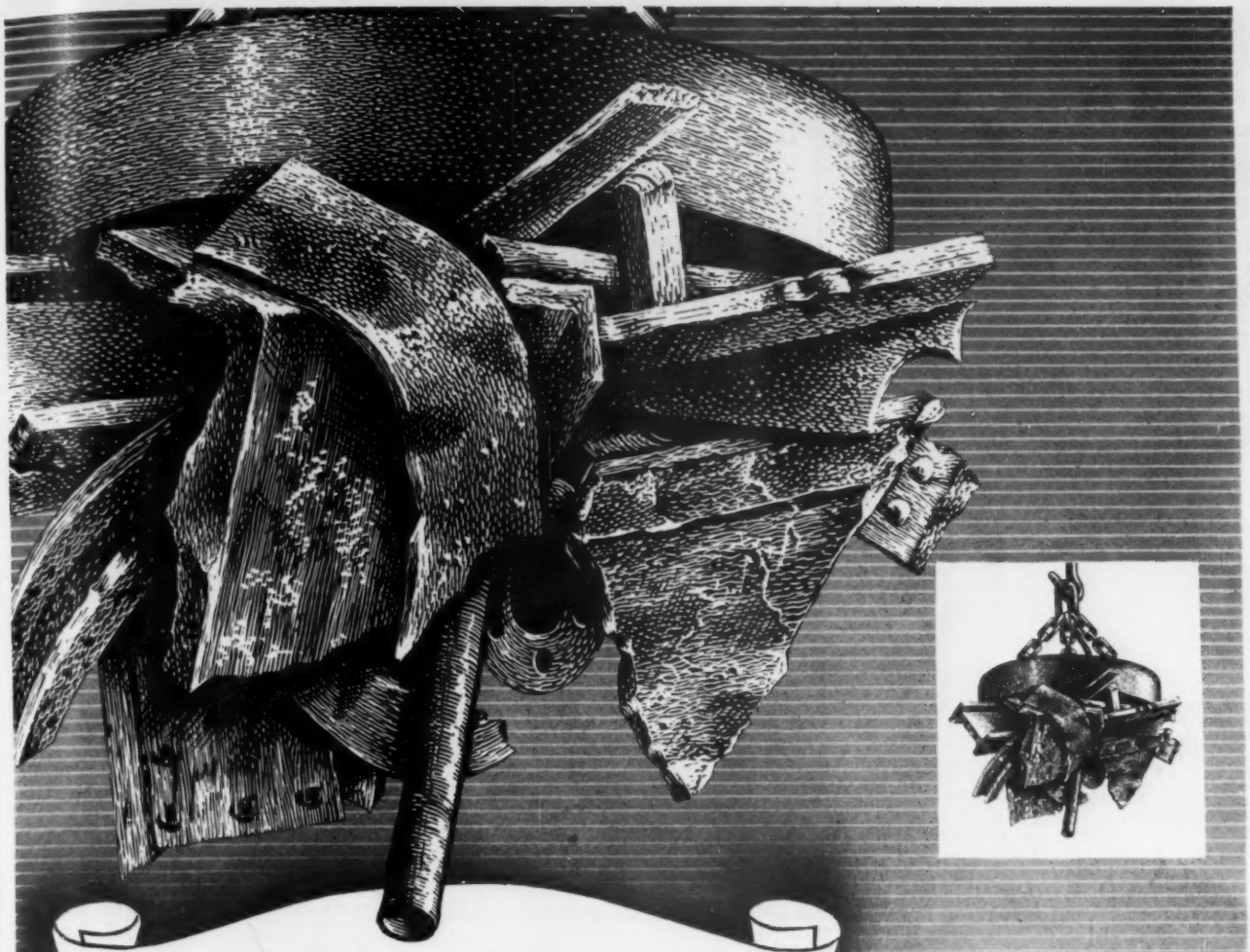
St. Louis—The trade here awaits activity by the mills before following the Chicago market with general price advances. Mills have large inventories and business does not warrant any heavy purchasing of scrap. A leading melter increased its buying prices for No. 2 heavy melting $1.25 a ton and $4 a ton for unstripped motor block. No. 2 bundles are off 50¢ a ton and rerolling rails are in short supply.

Cincinnati—Re-entry of a local consumer into the market has raised No. 1 heavy melting $1 to $24 delivered. All other openhearth went up sympathetically. Increased foundry demand also resulted in $1 to $2 price jumps in cast scrap.

Buffalo—Market here has stiffened at the higher prices posted last week. Dealers are refusing to accept new orders at those levels because of covering difficulties. In addition to local buying, a Chicago inquiry for barge shipment is unfilled.

Boston—A little No. 1 heavy melting is moving locally but there seems to be absolutely no demand for No. 1 bundles. Other than the trickle of heavy melting, the New England scrap situation is still a sad one.

West Coast—The Southern California market last week was considerably stronger than it has been in months. Main reasons are brief return of one steel producer to market and continuing exports to Japan. One dealer is reported shopping heavily for export with estimated tonnage of 25,000, mostly in No. 2 heavy melting. Two other Los Angeles dealers reported seeking turnings for export. Price of No. 1 bundles was incorrectly listed last week. Correct price was $17.



A SYMBOL OF LEADERSHIP
IN IRON & STEEL SCRAP
SINCE 1889

Luria Brothers and Company, Inc.

MAIN OFFICE
LINCOLN-LIBERTY BLDG.
Philadelphia 7, Penna.

PLANTS
LEBANON, PENNA. DETROIT (ECORSE), MICHIGAN
READING, PENNA. PITTSBURGH, PENNA.
MODENA, PENNA. ERIE, PENNA.

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BIRMINGHAM, ALA.	DETROIT, MICHIGAN	PITTSBURGH, PENNA.
BOSTON, MASS.	HOUSTON, TEXAS	PUEBLO, COLORADO
BUFFALO, N. Y.	LEBANON, PENNA.	READING, PENNA.
CHICAGO, ILLINOIS	LOS ANGELES, CAL.	ST. LOUIS, MO.
CLEVELAND, OHIO	NEW YORK, N. Y.	SAN FRANCISCO, CAL.
	SEATTLE, WASH.	

EXPORTS-IMPORTS DIV. **LIVINGSTON & SOUTHARD, INC.** 99 Park Ave., New York, N. Y. *Cable Address:* FORENTRACO

Scrap Prices

(Effective Apr. 13, 1954)

Pittsburgh

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 bundles	26.00 to 27.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	14.00 to 15.00
Mixed. bor. and ms. turns.	14.00 to 15.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs, plate	29.00 to 30.00
Cut str'ct'r'ls, 3 ft & under	31.00 to 32.00
Heavy turnings	24.00 to 25.00
No. 1 RR. hvy. melting	30.00 to 31.00
Scrap rails, random lgth	37.00 to 38.00
Rails 2 ft and under	43.00 to 44.00
RR. steel wheels	33.00 to 34.00
RR. spring steel	33.00 to 34.00
RR. couplers and knuckles	33.00 to 34.00
No. 1 machinery cast.	41.00 to 42.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	30.00 to 31.00

Chicago

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	25.00 to 27.00
No. 1 factory bundles	29.00 to 30.00
No. 1 dealers' bundles	27.00 to 28.00
No. 2 dealers' bundles	18.00 to 20.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Low phos. forge crops	35.00 to 37.00
Low phos. punch'gs, plate	32.00 to 33.00
Low phos. 3 ft and under	31.00 to 32.00
No. 1 RR. hvy. melting	30.00 to 32.00
Scrap rails, random lgth.	33.00 to 34.00
Rerolling rails	37.00 to 39.00
Rails 2 ft and under	42.00 to 43.00
Locomotive tires, cut	33.00 to 35.00
Cut bolsters & side frames	35.00 to 36.00
Angles and splice bars	36.00 to 38.00
RR. steel car axles	38.00 to 39.00
RR. couplers and knuckles	33.00 to 35.00
No. 1 machinery cast.	39.00 to 40.00
Cupola cast.	36.00 to 37.00
Heavy breakable cast.	30.00 to 32.00
Cast iron brake shoes	35.00 to 37.00
Cast iron car wheels	33.00 to 35.00
Malleable	40.00 to 41.00
Stove plate	29.00 to 31.00

Philadelphia Area

No. 1 hvy. melting	$21.00 to $22.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 bundles	21.00 to 22.00
No. 2 bundles	17.00 to 18.00
Machine shop turn.	10.00 to 11.00
Mixed bor. short turn.	10.00 to 11.00
Cast iron borings	10.00 to 11.00
Shoveling turnings	15.00 to 16.00
Clean cast chem borings	24.00 to 25.00
Low phos. 5 ft and under	24.00 to 26.00
Low phos. 2 ft and under	25.00 to 27.00
Low phos. punch'gs	25.00 to 27.00
Elec. furnace bundles	23.00 to 24.00
Heavy turnings	20.00 to 21.00
RR. steel wheels	29.00 to 30.00
RR. spring steel	29.00 to 30.00
Rails 18 in. and under	39.00 to 40.00
Cupola cast	34.00 to 35.00
Heavy breakable cast.	36.00 to 37.00
Cast iron carwheels	38.00 to 39.00
Malleable	38.00 to 39.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	39.00 to 40.00
Charging box cast.	36.00 to 37.00

Cleveland

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 bundles	23.00 to 24.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	23.00 to 24.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	14.50 to 15.50
Shoveling turnings	14.50 to 15.50
Cast iron borings	14.50 to 15.50
Cut struct'r'l plate, 2 ft & under	31.50 to 32.50
Drop forge flashings	23.00 to 24.00
Low phos. 2 ft & under	24.00 to 25.00
No. 1 RR. heavy melting	26.00 to 27.00
Rails 3 ft and under	43.00 to 44.00
Rails 18 in. and under	44.00 to 45.00
Railroad grate bars	27.00 to 28.00
Steel axle turnings	19.00 to 20.00
Railroad cast	39.00 to 40.00
No. 1 machinery cast.	40.00 to 41.00
Stove plate	33.00 to 34.00
Malleable	39.00 to 40.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	17.50 to 18.50
Cast iron borings	17.50 to 18.50
Low phos. plate	31.00 to 32.00

Buffalo

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	19.50 to 20.50
No. 1 busheling	23.00 to 24.00
No. 1 bundles	23.00 to 24.00
No. 2 bundles	17.50 to 18.50
Machine shop turn.	14.00 to 14.50
Mixed bor. and turn.	16.50 to 17.00
Shoveling turnings	17.50 to 18.00
Cast iron borings	16.50 to 17.00
Low phos. plate	27.00 to 28.00
Scrap rails, random, lgth.	33.00 to 34.00
Rails 2 ft and under	40.00 to 41.00
RR. steel wheels	34.00 to 35.00
RR. spring steel	34.00 to 35.00
RR. couplers and knuckles	34.00 to 35.00
No. 1 machinery cast.	38.00 to 39.00
No. 1 cupola cast.	34.00 to 35.00

Detroit

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$16.00 to $17.00
No. 2 hvy. melting	14.00 to 15.00
No. 1 bundles, openhearth	17.00 to 18.00
No. 2 bundles	14.00 to 15.00
New busheling	16.00 to 17.00
Drop forge flashings	16.00 to 17.00
Machine shop turn.	5.50 to 6.50
Mixed bor. and turn.	7.50 to 8.50
Shoveling turnings	7.50 to 8.50
Cast iron borings	7.50 to 8.50
Low phos. punch's, plate	17.00 to 18.00
No. 1 cupola cast.	35.00
Heavy breakable cast.	24.00
Stove plate	28.00
Automotive cast.	35.00

St. Louis

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	24.25 to 25.25
No. 1 bundles	25.00 to 26.00
No. 2 bundles	19.50 to 20.50
Machine shop turn.	10.00 to 11.00
Cast iron borings	12.00 to 13.00
Shoveling turnings	12.00 to 13.00
No. 1 RR. hvy. melting	29.00 to 30.00
Rails, random lengths	34.00 to 35.00
Rails, 18 in. and under	37.00 to 39.00
Locomotive tires, uncut	29.00 to 30.00
Angles and splice bars	30.50 to 32.00
Std. steel car axles	35.00 to 36.00
RR. spring steel	31.50 to 32.50
Cupola cast.	38.00 to 39.00
Hvy. breakable cast.	23.00 to 24.00
Cast iron brake shoes	30.00 to 31.00
Stove plate	31.00 to 32.00
Cast iron car wheels	30.00 to 31.00
Malleable	34.00 to 35.00
Unstripped motors blocks	27.00 to 28.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$13.00 to $14.00
No. 2 hvy. melting	11.00 to 12.00
No. 2 bundles	9.00 to 10.00
Machine shop turn.	4.00 to 5.00
Mixed bor. and turn.	6.00 to 7.00
Shoveling turnings	7.00 to 8.00
Clean cast chem. borings	18.00 to 19.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	29.00 to 30.00
Unstripped motor blocks.	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	20.00
No. 2 bundles	$15.00 to 16.00
No. 1 busheling	20.00
Machine shop turn.	13.00
Shoveling turnings	15.00
Cast iron borings	13.00 to 14.00
Electric furnace bundles	25.00 to 26.00
Bar crops and plate	28.00 to 29.00
Structural and plate, 2 ft.	28.00 to 29.00
No. 1 RR. hvy. melting	24.00 to 25.00
Scrap rails, random lgth.	32.00 to 33.00
Rails, 18 in. and under	37.00 to 38.00
Angles & splice bars	35.00 to 36.00
Rerolling rails	33.00 to 34.00
No. 1 cupola cast.	40.00 to 41.00
Stove plate	37.00 to 38.00
Cast iron car wheels	33.00 to 34.00
Charging box cast.	23.00 to 24.00
Heavy breakable	24.00 to 25.00
Unstripped motor blocks.	31.00 to 32.00
Mashed tin cans	14.00 to 15.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$13.00 to $16.00
No. 2 hvy. melting	9.00 to 11.00
No. 1 bundles	12.00 to 14.00
No. 2 bundles	7.00 to 9.00
No. 1 busheling	11.00 to 12.00
Elec. furnace, 3 ft & under	13.00 to 16.00
Machine shop turn.	1.00 to 1.50
Mixed bor. and short turn.	6.00 to 7.00
Shoveling turnings	7.00 to 7.50
Clean cast chem. borings	10.00 to 11.00
No. 1 machinery cast.	27.00 to 28.00
Mixed cupola cast	23.00 to 24.00
Heavy breakable cast.	25.00 to 25.50
Stove plate	22.00 to 23.00
Unstripped motor blocks	7.00 to 8.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 bundles	23.00 to 24.00
No. 2 bundles	17.00 to 18.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	11.00 to 11.50
Shoveling turnings	13.00 to 14.00
Cast iron borings	11.00 to 11.50
Low phos., 18 in. & under	30.00 to 31.00
Rails, random lengths	34.00 to 35.00
Rails, 18 in. and under	42.00 to 43.00
No. 1 cupola cast.	35.00 to 36.00
Hvy. breakable cast.	31.00 to 32.00
Drop broken cast.	42.00 to 43.00

San Francisco

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Machine shop turn.	5.00
Cast iron borings	9.00
No. 1 RR. hvy. melting	23.00
No. 1 cupola cast.	$39.00 to 40.00

Los Angeles

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	16.00
*No. 1 bundles	17.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Machine shop turn.	5.00
Shoveling turnings	$7.00 to 9.00
Cast iron borings	7.00 to 9.00
Elec. fur. 1 ft and under	25.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast.	$7.00 to 35.00

* Price for Apr. 6 was $17.00.

Seattle

No. 1 hvy. melting	$23.00
No. 2 hvy. melting	19.00
No. 1 bundles	22.00
No. 2 bundles	16.00
No. 3 bundles	12.00
No. 1 cupola cast.	37.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	$22.00
No. 2 hvy. melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
Mixed steel scrap	16.00
Bushelings	17.00
Bush., new fact prep'd.	20.00
Bush., new fact unprep'd.	16.00
Short steel turnings	12.00
Mixed bor. and turn.	12.00
Rails, remelting	31.00
Cast scrap	$42.00 to 45.00

You can't beat **Ohio Magnets** for

heavier construction

OHIO BOLTED MAGNETS. 12 to 65" dia. 6-coil types in 39 to 65"; 8-coil in 55 & 65". Strap coils over 39". Bolts protected in recessed wells. Also capsule-coil over 45".

OHIO WELDED MAGNETS. 39 to 65" dia. Lightweight models in 39 & 45". 6-coil in 46, 55, 65"; 8-coil in 55 & 65". Weld on top where it can't get dented in. Also capsule-coil over 45".

OHIO BASKET MAGNETS. 55 & 65" 4-coil, & 65" 6-coil. For extra heavy-duty service. No weight carried by bolts. Also capsule-coil over 45".

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Ohio gives prompt service in reconditioning and rebuilding magnets

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THE OHIO ELECTRIC MFG. CO.
5400 DUNHAM RD., • CLEVELAND, OHIO

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CHESTER BLAND
President

Comparison of Prices

(Effective Apr. 13, 1954)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Apr. 13 1954	Apr. 6 1954	Mar. 16 1954	Apr. 14 1953
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.925¢	3.925¢	3.925¢	3.775¢
Cold-rolled sheets	4.775	4.775	4.775	4.575
Galvanized sheets (10 ga.)	5.275	5.275	5.275	5.075
Hot-rolled strip	3.925	3.925	3.925	3.725
Cold-rolled strip	5.513	5.513	5.513	5.20
Plate	4.10	4.10	4.10	3.90
Plates wrought iron	9.30	9.30	9.30	9.00
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	38.48
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$8.95	$8.95	$8.95	$8.95
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.65
Special coated mfg. terns	7.75	7.75	7.75	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.16¢	4.16¢	4.16¢	3.95¢
Cold finished bars	5.20	5.20	5.20	4.925
Alloy bars	4.875	4.875	4.875	4.675
Structural shapes	4.10	4.10	4.10	3.85
Stainless bars (No. 302)	35.50	35.50	35.50	32.98
Wrought iron bars	10.40	10.40	10.40	10.05
Wire: (per pound)				
Bright wire	5.525¢	5.525¢	5.525¢	5.225¢
Rails: (per 100 lb.)				
Heavy rails	$4.325	$4.325	$4.325	$3.775
Light rails	5.20	5.20	5.20	4.25
Semifinished Steel: (per net ton)				
Rerolling billets	$62.00	$62.00	$62.00	$59.00
Slabs, rerolling	62.00	62.00	62.00	59.00
Forging billets	75.50	75.50	75.50	70.50
Alloy blooms, billets, slabs	82.00	82.00	82.00	76.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.525¢	4.525¢	4.525¢	4.325¢
Skelp	3.75	3.75	3.75	3.55
Finished Steel Composite: (per pound)				
Base price	4.634¢	4.634¢	4.634¢	4.376¢

	Apr. 13 1954	Apr. 6 1954	Mar. 16 1954	Apr. 14 1953
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$61.19	$61.19	$61.19	$60.69
Foundry, Valley	56.50	56.50	56.50	55.00
Foundry, Southern, Cin'ti	60.43	60.43	60.43	59.93
Foundry, Birmingham	52.88	52.88	52.88	51.38
Foundry, Chicago	56.50	56.50	56.50	55.00
Basic del'd, Philadelphia	60.27	60.27	60.27	59.77
Basic, Valley furnace	56.00	56.00	56.00	54.50
Malleable, Chicago	56.50	56.50	56.50	55.00
Malleable, Valley	56.50	56.50	56.50	55.00
Ferromanganese‡, cents per lb.	10.00¢	10.00¢	10.00¢	8.00¢
‡ 76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$56.59	$56.59	$56.59	$55.28
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$26.50	$25.50	$24.50	$43.75
No. 1 steel, Phila. area	21.50	21.50	22.00	43.50
No. 1 steel, Chicago	27.50	26.50	23.50	41.00
No. 1 bundles, Detroit	17.50	17.50	16.50	40.50
Low phos., Youngstown	31.50	27.50	26.50	49.50
No. 1 mach'y cast, Pittsburgh	41.50	41.50	41.50	50.50
No. 1 mach'y cast, Philadel'a.	39.50	39.50	38.50	47.50
No. 1 mach'y cast, Chicago	39.50	37.50	37.00	45.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$25.17	$24.50	$23.33	$42.75
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.38	$14.38	$14.38	$14.75
Foundry coke, prompt	16.75	16.75	16.75	17.75

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	29.875‡	29.875‡	31.00‡
Copper, Lake, Conn.	30.00	30.00	30.00	33.00
Tin, Straits, New York	91.01†	94.50*	92.50	98.50
Zinc, East St. Louis	10.25	10.25	9.75	11.00
Lead, St. Louis	13.80	13.55	12.80	12.80
Aluminum, virgin ingot	21.50	21.50	21.50	20.50
Nickel, electrolytic	63.08	63.08	63.08	63.08
Magnesium, ingot	27.75	27.75	27.75	27.00
Antimony, Laredo, Tex.	28.50	28.50	28.50	34.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

← To identify producers, see Key on p. 169 →

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	58.00	58.50	59.00	59.50	.....
Birmingham *R3*	52.38	52.88	.....	.....	.....
Birmingham *W9*	52.38	52.88	.....	.....	.....
Birmingham *S5*	52.38	52.88	.....	.....	.....
Buffalo *R3*	56.00	56.50	57.00	.....	.....
Buffalo *H1*	56.00	56.50	57.00	.....	.....
Buffalo *W6*	56.00	56.50	57.00	.....	.....
Chicago *I4*	56.00	56.50	56.50	57.00	.....
Cleveland *A5*	56.00	56.50	56.50	57.00	61.00
Cleveland *R3*	56.00	56.50	56.50	.....	.....
Daingerfield *L3*	52.50	52.50	52.50	.....	.....
Duluth *I4*	56.00	56.50	56.50	57.00	.....
Erie *I4*	56.00	56.50	56.50	57.00	.....
Everett *M6*	.....	61.25	61.75	.....	.....
Fontana *K1*	62.00	62.50	.....	.....	.....
Geneva, Utah *C7*	56.00	56.50	.....	.....	.....
Granite City *G2*	57.90	58.40	58.90	.....	.....
Hubbard *Y1*	.....	.....	56.50	.....	.....
Minnequa *C6*	58.00	59.00	59.00	.....	.....
Monessen *P6*	56.00	.....	.....	.....	.....
Neville Isl. *P4*	56.00	56.50	56.50	.....	.....
Pittsburgh *U1*	56.00	.....	.....	57.00	.....
Sharpsville *S3*	56.00	56.50	56.50	57.00	.....
Steelton *B3*	58.00	58.50	59.00	59.50	64.00
Swedeland *A2*	58.00	58.50	59.00	59.50	.....
Toledo *I4*	56.00	56.50	56.50	57.00	.....
Troy, N. Y. *R3*	58.00	58.50	59.00	59.50	64.00
Youngstown *Y1*	.....	.....	56.50	57.00	.....
N. Tonawanda *T1*	.....	56.50	57.00	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct., $2 per ton for .05 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 and over.

Silvery Iron: Buffalo, *H1*, $68.25; Jackson, *J1*, *G1* $67.00. Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct. or more phosphorus. Add 75¢ for each 0.50 pct. manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb., f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00	.....	14.25
Slabs, billets, rerolling	20.50–20.75	22.75	24.75	23.75	36.25	29.50	32.25	18.25	.....	18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50–46.75	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	58.75–59.00	45.75–46.00	51.25	30.00	30.50–31.00	30.50
Sheets	46.25	46.50	48.75	48.75	64.25–64.50	55.50	60.75	40.75	41.25	43.50
Strip, hot-rolled	29.75	32.00	36.75	34.25	55.00	42.00	46.50	26.25	.....	27.00
Strip, cold-rolled	38.25	41.50	45.50	43.75	66.50	54.50	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4.*

Strip: Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Middletown, O., *A7;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (.25¢ per lb higher) *W1* (.25¢ per lb higher); New Bedford, Mass., *R6.*

Bars: Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

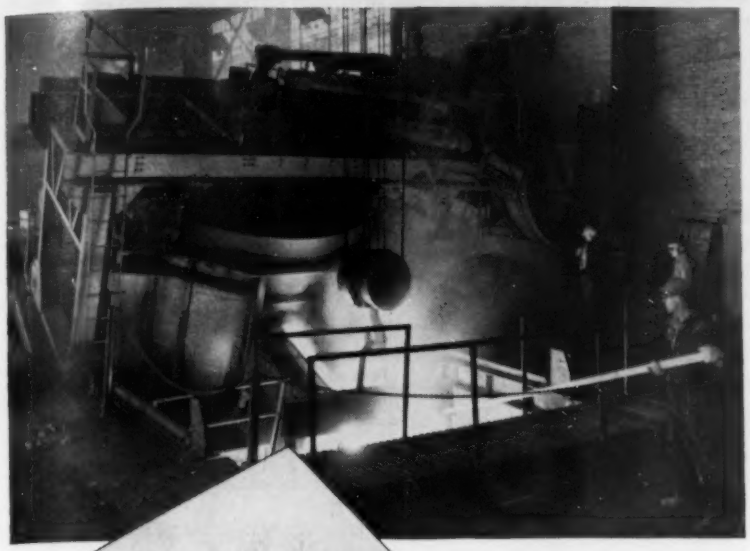
Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15.*

Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa., *J2.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3,* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11.*

Down go Stainless Costs with IngAclad



Stainless-Clad Steel

With IngAclad *stainless-clad* steel, you get all the advantages of solid stainless—yet *at much lower cost.* Same corrosion resistance.* Same protective properties. And—it's easier to fabricate.

Double saving—lower material costs, lower fabricating costs. 20% thickness of solid stainless, inseparably bonded to 80% backing of mild steel.

* *On stainless side*

IngAclad — *for lowest cost stainless protection*

ALSO: SOLID STAINLESS AND HEAT-RESISTING STEELS

Write, wire or phone for details **Ingersoll**

ENGINEERING B-W PRODUCTION

STEEL DIVISION

Borg-Warner Corporation

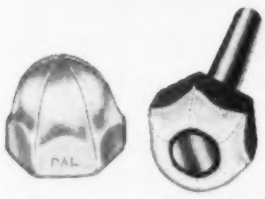
310 S. Michigan Ave., Chicago 4, Illinois

Plant: New Castle, Indiana

NO THREADS NEEDED!

PUSHNUTS
Trademark

Low cost—speedy assembly—hold tight

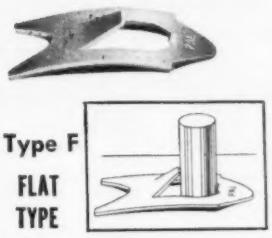


Type C Type K

For unthreaded Rods and Axles

Used on wheels of play vehicles; also other permanent applications.

Place PUSHNUT on rod, tap with hammer. Patented locking method resists 100 lbs. or more. Eliminates threading, notching, cotter pins. Made of heat-treated spring steel, in pleasing acorn or semi-acorn styles and various finishes, for 3/16", 1/4" and 5/16" rod.



Type F
FLAT TYPE

For unthreaded Studs and Rods

Ideal for nameplates, mouldings and other light parts.

Slips easily over stud, instantly locks with push of simple inexpensive applicator. Spring tension pulls parts snugly to base—energized grip holds tight against loosening or rattling. Choice of finishes for 3/32", 1/8" and 3/16" studs.

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CHARLES MUNDT & SONS

90 FAIRMOUNT AVE. JERSEY CITY, N. J

IRON AGE

STEEL PRICES

(Effective Apr. 13, 1954)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$82.00 *B3*		4.15 *B3*	6.20 *B3*	4.15 *B3*						
	Buffalo, N. Y.	$62.00 *B3*	$75.50 *B3, R3*	$82.00 *B3, R3*	4.925 *B3*	4.15 *B3*	6.20 *B3*	4.15 *B3*	3.925 *B3, R3*	5.45 *B3*	6.00 *B3*	8.425 *B3*		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.								4.05 *A2*		5.90 *A2*			
	New Bedford, Mass.									6.00 *R6*				
	Harrison, N. J.													12.00 *C11*
	Johnstown, Pa.	$62.00 *B3*	$75.50 *B3*	$82.00 *B3*		4.15 *B3*	6.20 *B3*							
	Fairless, Pa.													
	New Haven, Conn.									5.90 *D1* 6.20 *A5*				
	Phoenixville, Pa.					4.15 *P2*		4.95 *P2*						
	Sparrows Pt., Md.								3.925 *B3*	5.45 *B3*	6.00 *B3*	8.425 *B3*		
	Wallingford, Conn.									5.90 *W1*				
	Worcester, Mass.									6.30 *A5*				12.30 *A5* 12.45 *N7*
MIDDLE WEST	Alton, Ill.								4.10 *L1*					
	Ashland, Ky.								3.925 *A7*					
	Canton-Massillon, Dover, Ohio			$82.00 *R3, T5*										12.00 *G4*
	Chicago, Ill.	$62.00 *U1*	$75.50 *R3, U1, W8*	$82.00 *U1, W8, R3*	4.925 *U1*	4.10 *U1, W8*	6.175 *U1, Y1*	4.10 *U1*	3.925 *A1, W8*	5.70 *A1*	5.95 *R3*		6.40 *W8*	
	Sterling, Ill.													
	Cleveland, Ohio		$75.50 *R3*							5.45 *A5, J3*		7.80 *J3* 8.15 *A5*		12.00 *A5* 12.15 *N7*
	Detroit, Mich.			$84.00 *R5*					4.125 *G3* 4.15 *M2*	5.65 *D1, D2, G3, M2, P11*	6.15 *G3*	7.90 *D2* 8.35 *G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$62.00 *U1*	$75.50 *U1*	$82.00 *U1, Y1*	4.925 *I3*	4.10 *I3, U1*	6.175 *U1, I3*		3.925 *I3, U1, Y1*	5.70 *I3*	5.95 *U1, I3* 6.45 *Y1*		6.40 *U1*	
	Granite City, Ill.													
	Indianapolis, Ind.									5.60 *C5*				
	Mansfield, Ohio													
	Middletown, Ohio									5.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.								3.925 *S1*	5.45 *S1, T4*	5.95 *S1*	7.65 *S1*	6.40 *S1*	12.00 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$62.00 *U1, J3*	$75.50 *J3, U1*	$82.00 *U1, C11*	4.925 *U1*	4.10 *J3, U1*	6.175 *J3, U1*	4.10 *U1*	3.925 *A7, P6* 3.95 *S7* 4.425 *S9*	5.45 *B4, J3, S7*		7.80 *J3*	6.40 *S9* 6.45 *S7*	12.00 *S9* 12.15 *S7*
	Portsmouth, Ohio								3.925 *P7*					
	Weirton, Wheeling, Follansbee, W. Va.					4.10 *W3*			3.925 *W3*	5.45 *F3, W3*	5.95 *W3*	8.15 *W3*		
	Youngstown, Ohio			$82.00 *Y1, C10*		4.10 *Y1*	6.675 *Y1*		3.925 *R3, U1, Y1*	5.45 *R3, Y1, C5*	5.95 *U1, R3* 6.45 *Y1*	7.60 *R3* 8.30 *Y1*	6.40 *U1*	12.00 *C5*
WEST	Fontana, Cal.	$70.00 *K1*	$83.50 *K1*	$101.00 *K1*		4.75 *K1*	6.825 *K1*	5.10 *K1*	4.70 *K1*	7.35 *K1*	7.05 *K1*		7.80 *K1*	13.65 *K1*
	Geneva, Utah		$75.50 *C7*			4.10 *C7*	6.175 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.775 *S2*		4.525 *S2*		6.55 *S2*		7.00 *S2*	
	Los Angeles, Torrance, Cal.		$85.00 *B2*	$102.00 *B2*		4.80 *B2, C7*	6.85 *B2*		4.675 *B2, C7*	7.50 *C1*			7.60 *B2*	
	Minnequa, Colo.					4.55 *C6*			5.025 *C6*					
	San Francisco, Niles, Pittsburg, Cal.		$85.00 *B2*			4.75 *B2* 4.91 *P9*	6.80 *B2*		4.675 *B2, C7*					
	Seattle, Wash.		$89.00 *B2*			4.85 *B2*	6.90 *B2*							
SOUTH	Atlanta, Ga.								4.125 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$62.00 *T2*	$75.50 *T2*			4.10 *R3, T2*	6.175 *T2*		3.925 *R3, T2, C16*		5.95 *T2*			
	Houston, Tex.		$83.50 *S2*	$90.00 *S2*		4.50 *S2*			4.325 *S2*				6.80 *S2*	

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

IRON AGE

STEEL PRICES

(Effective Apr. 13, 1954)

SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Hollowware Enameling 29 ga.	
													Bethlehem, Pa.
3.925 *B3*	4.775 *B3*				5.90 *B3*	7.225 *B3*			4.525 *W6*				Buffalo, N. Y.
										† Special coated mfg. terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb deduct $2.20 from 1.25-lb coke base box. * COKES: 1.50-lb add 25¢. ELECTRO: 0.50-lb add 25¢; 0.75-lb add 65¢; 1.00-lb add $1.20.			Claymont, Del.
													Coatesville, Pa.
3.975 *A2*					5.90 *A2*								Conshohocken, Pa.
													Harrisburg, Pa.
													Hartford, Conn.
									4.525 *B3*				Johnstown, Pa.
3.975 *U1*	4.825 *U1*				5.95 *U1*	7.275 *U1*				$8.80 *U1*	$7.50 *U1*		Fairless, Pa.
													New Haven, Conn.
													Phoenixville, Pa.
3.925 *B3*	4.775 *B3*	5.275 *B3*			5.90 *B3*	7.225 *B3*	8.075 *B3*		4.625 *B3*	$8.80 *B3*	$7.50 *B3*		Sparrows Pt., Md.
									4.825 *A5*				Worcester, Mass.
													Trenton, N. J.
									4.70 *L1*				Alton, Ill.
3.925 *A7*		5.275 *A7*	5.175 *A7*										Ashland, Ky.
		5.275 *R1, R3*						5.05 *R1*					Canton-Massillon, Dover, Ohio
3.925 *A1, W8*					5.90 *U1*				4.525 *A5, N4, R3*				Chicago, Joliet, Ill.
									4.625 *N4*				Sterling, Ill.
3.925 *J3, R3*	4.775 *J3, R3*		5.175 *R3*		5.90 *J3, R3*	7.225 *J3, R3*			4.525 *A5*				Cleveland, Ohio
4.125 *G3* 4.15 *M2*	4.975 *G3*				6.10 *G3*	7.425 *G3*							Detroit, Mich.
3.925 *N5*													Newport, Ky.
3.925 *I3, U1, Y1*	4.775 *I3, U1, Y1*	5.275 *U1, I3*	5.175 *I3, U1*	5.675 *U1*	5.90 *U1, I3* 6.40 *Y1*	7.225 *U1* 7.725 *Y1*				$8.70 *I3, U1, Y1*	$7.40 *I3, U1*	6.10 *U1, Y1*	Gary, Ind. Harbor, Indiana
4.125 *G2*	4.975 *G2*	5.475 *G2*	5.875 *G2*								$7.60 *G2*	6.30 *G2*	Granite City, Ill.
4.025 *C9*		5.375 *C9*						5.025 *C9*	4.625 *C9*				Kokomo, Ind.
				5.675 *E2*				5.05 *E2*					Mansfield, Ohio
	4.775 *A7*		5.175 *A7*	5.675 *A7*									Middletown, Ohio
3.925 *S1* 5.175 *N3*	5.80 *N3*	5.275 *N3*	6.525 *N3*	5.45 *S1* 5.675 *N3*	5.90 *S1*						$7.40 *R3*		Niles, Ohio Sharon, Pa.
3.925 *J3, U1, P6, A7*	4.775 *J3, U1, P6*	5.275 *U1*	5.175 *U1*		5.90 *J3, U1*	7.225 *J3, U1*	7.925 *U1*		4.525 *A5* 4.725 *P6*	$8.70 *J3, U1*	$7.40 *J3, U1*	6.10 *U1*	Pittsburgh, Pa. Midland, Pa. Butler, Pa.
3.925 *P7*	4.775 *P7*								4.525 *P7*				Portsmouth, Ohio
3.925 *W3, W5*	4.775 *W3, W5, F3*	5.275 *W3, W5*		5.675 *W3, W5*	5.90 *W3*	7.225 *W3*				$8.70 *W3, W5*	$7.40 *W3, W5*	6.10 *F3, W5*	Weirton, Wheeling, Follansbee, W. Va.
3.925 *R3, U1, Y1*	4.775 *R3, Y1*		5.175 *Y1*		5.90 *U1, R3* 6.40 *Y1*	7.225 *R3* 7.725 *Y1*			4.525 *Y1*	$8.70 *R3*			Youngstown, Ohio
4.70 *K1*	5.875 *K1*				6.675 *K1*	8.275 *K1*			5.325 *K1*				Fontana, Cal.
4.025 *C7*													Geneva, Utah
								4.775 *C6*	4.865 *S2*				Kansas City, Mo.
4.025 *C7*		6.275 *C7*							5.325 *B2*				Los Angeles, Torrance, Cal.
									4.775 *C6*				Minnequa, Colo.
4.025 *C7*	5.725 *C7*	6.025 *C7*							5.175 *C7*	$9.45 *C7*	$8.15 *C7*		San Francisco, Niles, Pittsburg, Cal.
													Seattle, Wash.
													Atlanta, Ga.
3.925 *R3, T2*	4.775 *T2*	5.275 *R3, T2*			5.90 *T2*			5.125 *T2* 5.225 *R3*	4.525 *T2 R3*	$8.80 *T2*	$7.50 *T2*		Fairfield, Ala. Alabama City, Ala.
4.325 *S2*									4.925 *S2*				Houston, Texas

STEEL PRICES

(Effective Apr. 18, 1954)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg's. Bright
EAST	Bethlehem, Pa.				4.875 *B3*	6.325 *B3*	6.225 *B3*					
	Buffalo, N. Y.	4.15 *B3* 4.18 *R3*	4.15 *B3,R3*	5.25 *B5*	4.875 *B3,R3*	6.325 *B3,B5*	6.225 *B3*	4.10 *B3*			6.25 *B3*	5.525 *W6*
	Claymont, Del.							4.10 *C4*		5.55 *C4*		
	Coatesville, Pa.							4.10 *L4*		5.55 *L4*		
	Conshohocken, Pa.							4.10 *A2*	5.15 *A2*		6.25 *A2*	
	Harrisburg, Pa.							4.10 *C3*	5.15 *C3*			
	Hartford, Conn.			5.75 *R3*		6.775 *R3*						
	Johnstown, Pa.	4.15 *B3*	4.15 *B3*		4.875 *B3*		6.225 *B3*	4.10 *B3*		5.55 *B3*	6.25 *B3*	5.525 *B3*
	Fairless, Pa.	4.30 *U1*	4.30 *U1*		5.025 *U1*							
	Newark, N. J.			5.65 *W10*		6.65 *W10*						
	New Haven, Conn.											
	Camden, N. J.			5.65 *P10*		6.50 *P10*						
	Putnam, Conn.			5.75 *W10*								
	Sparrows Pt., Md.		4.15 *B3*					4.10 *B3*		5.55 *B3*	6.25 *B3*	5.625 *B3*
	Palmer, Worcester, Mansfield, Mass.			5.75 *B5* 6.10 *W11*		6.775 *B5*						5.825 *A5, W6*
	Readville, Mass.			5.75 *C14*								
MIDDLE WEST	Alton, Ill.	4.35 *L1*										5.70 *L1*
	Ashland, Ky.							4.10 *A7*				
	Canton-Massillon, Ohio			5.20 *R2,R3*	4.875 *R3,T5*	6.325 *R2,R3, T5*						
	Chicago, Joliet, Ill.	4.15 *U1, N4,W8* 4.22 *R3*	4.15 *R3,N4*	5.20 *A5,W10, W8,B5,L2*	4.875 *U1, W8,R3*	6.325 *A5,W8, W10,L2, R3,B5*		4.10 *U1,W8*	5.15 *U1*	5.55 *U1*	6.25 *U1*	5.525 *A1, R3,N4,W7*
	Cleveland, Ohio	4.21 *R3*	4.15 *R3*	5.20 *A5,C13*		6.325 *A5, C13*		4.10 *J3,R3*	5.15 *J3*		6.25 *J3*	5.525 *A5, R3,C13*
	Detroit, Mich.	4.30 *R5* 4.35 *G3*		5.35 *R5,P8* 5.40 *B5* 5.45 *P3*	4.975 *R5* 5.075 *G3*	6.425 *R5* 6.475 *P8* 6.525 *B5,P3*	6.425 *G3*	4.30 *G3*			6.45 *G3*	
	Duluth, Minn.											5.525 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.15 *I3, U1, Y1*	4.15 *I3, U1, Y1*	5.20 *R3*	4.875 *I3, U1, Y1*	6.325 *R3,M5*	6.225 *U1,I3* 6.725 *Y1*	4.10 *I3, U1, Y1*	5.15 *I3*	5.55 *U1*	6.25 *U1,I3* 6.75 *Y1*	5.625 *M4*
	Granite City, Ill.							4.30 *G2*				
	Kokomo, Ind.											5.625 *C9*
	Sterling, Ill.	4.25 *N4*	4.25 *N4*									5.625 *N4*
	Niles, Ohio Sharon, Pa.							4.10 *S1*		5.55 *S1*	6.25 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.15 *J3, U1*	4.15 *J3, U1*	5.20 *A5, J3, W10,R3,C8*	4.875 *U1,C11*	6.325 *A5,C11, W10,C8*	6.225 *J3, U1*	4.10 *J3, U1*	5.15 *U1*	5.55 *U1*	6.25 *J3, U1*	5.525 *A5, J3,P6*
	Portsmouth, Ohio											5.525 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.15 *W3*						4.10 *W3*				
	Youngstown, Ohio	4.15 *U1,Y1* 4.20 *R3*	4.15 *R3, U1, Y1*	5.20 *Y1,F2*	4.875 *U1,Y1, C10*	6.325 *Y1, C10,F2*	6.225 *U1* 6.725 *Y1*	4.10 *R3, U1, Y1*			6.75 *Y1*	5.525 *Y1*
WEST	Emeryville, Cal.	4.90 *J5*	4.90 *J5*									
	Fontana, Cal.	4.85 *K1*	4.85 *K1*		5.925 *K1*		7.475 *K1*	4.75 *K1*		6.60 *K1*	6.95 *K1*	
	Geneva, Utah							4.10 *C7*			6.25 *C7*	
	Kansas City, Mo.	4.75 *S2*	4.75 *S2*		5.475 *S2*		6.825 *S2*					6.125 *S2*
	Los Angeles, Torrance, Cal.	4.85 *B2,C7*	4.85 *B2,C7*	6.65 *R3*	5.925 *B2*		6.925 *B2*					6.475 *B2*
	Minnequa, Colo.	4.60 *C6*	4.75 *C6*					4.95 *C6*				5.775 *C6*
	Portland, Ore.	4.90 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	4.85 *C7,P9* 4.90 *B2*	4.85 *C7,P9* 4.90 *B2*				6.975 *B2*					6.475 *C7*
	Seattle, Wash.	4.90 *B2,N6*	4.90 *B2*				6.975 *B2*	5.00 *B2*			7.15 *B2*	
SOUTH	Atlanta, Ga.	4.35 *A8*	4.35 *A8*									5.725 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.15 *T2,C16* 4.18 *R3*	4.15 *R3,T2, C16*				6.225 *T2*	4.10 *R3,T2*			6.25 *T2*	5.525 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.55 *S2*	4.55 *S2*		5.275 *S2*			4.50 *L3, S2*				5.925 *S2*

Steel Prices

(Effective Apr. 13, 1954)

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Fred Ulbrich & Sons, Wallingford, Conn.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. *B3*	24.25	8.0	27.25	12.0	29.75	15.5	32.25	16.5	32.75	17.5	33.25	18.0	34.75	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	13.25	+2.0	16.25	1.0	18.75	4.5	21.25	5.5	21.75	6.5	22.25	7.0	23.75	7.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Alton, Ill. *L1*	24.25	8.0	27.25	12.0	29.75	15.5	32.25	16.5	32.75	17.5	33.25	18.0	34.75	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	24.25	.....	27.25	.....	29.75	.....	32.25	.....	32.75	.....	33.25	.....	34.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Wheeling *W5*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Indiana Harbor *Y1*	25.25	9.0	28.25	13.0	30.75	16.5	33.25	17.5	33.75	18.5	34.25	19.0	35.75	19.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	27.75	13.0	31.75	17.0	33.75	20.5	34.25	19.5	34.75	20.5	35.25	21.0	35.75	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	16.75	.....	20.75	.....	22.75	.....	23.25	.....	23.75	.....	24.25	.....	24.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Alton, Ill. *L1*	27.75	13.0	31.75	17.0	33.75	20.5	34.25	19.5	34.75	20.5	35.25	21.0	35.75	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Wheeling *W5*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Indiana Harbor *Y1*	28.75	14.0	32.75	18.0	34.75	21.5	35.25	20.5	35.75	21.5	36.25	22.0	36.75	21.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75

Galvanized discounts based on zinc, at 11¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only buttweld and seamless, 2¼ pts. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 4½ pts. higher discount. Buttweld jobbers' discount, 5 pct. East St. Louis zinc price now 10.25¢.

Steel Prices

(Effective Apr. 13, 1954)

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.325	5.20	5.275				
So. Chicago *R3*				7.05			
Cleveland *R3*							
Ensley *T2*	4.325	5.20					
Fairfield *T2*		5.20		7.05		5.125	
Gary *U1*	4.325	5.20				5.125	
Ind. Harbor *I3*	4.325		5.275	7.05		5.125	
Johnstown *B3*		5.20					
Joliet *U1*		5.20	5.275				
Kansas City *S2*				7.30			11.00
Lackawanna *B3*	4.325	5.20	5.275			5.125	
Lebanon *B3*				7.05	10.50		11.00
Minnequa *C6*	4.325	5.70	5.275	7.05		5.125	11.00
Pittsburgh *O1*					10.50		11.00
Pittsburgh *P5*					10.50		11.00
Pittsburgh *J3*				7.05			
Pitt'g, Cal. *C7*						5.275	
Seattle *B7*				7.55		5.275	11.50
Steelton *B3*	4.325		5.275			5.125	
Struthers *Y1*							
Torrance *C7*						5.275	
Youngstown *R3*				7.05			

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field		8.05	
Armature	8.15	8.40	8.90
Elect.	8.75	9.00	9.50
Motor	9.75	10.00	10.50
Dynamo	10.65	10.90	11.40
Trans. 72	11.60	11.85	12.35
Trans. 65	12.15	Grain Oriented	
Trans. 58	12.65	Trans. 80	16.25
Trans. 52	13.65	Trans. 73	16.75

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I5*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

CLAD STEEL

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa., *L4*	*32.7	
Washington, Pa., *J2*	....	
Claymont, Del., *C4*	....	32.50
New Castle, Ind., *I2*	....	
Nickel-carbon		
10 pct. Coatesville, Pa., *L4*	37.5	
Inconel-carbon		
10 pct. Coatesville, Pa., *L4*	46.10	
Monel-carbon		
10 pct. Coatesville, Pa., *L4*	38.90	

* Includes annealing and pickling, sandblasting.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Cal	Woven Wire Fence 9–15½ ga. Cal	"T" Fence Posts Cal	Single Loop Bale Ties Cal	Galv. Barbed and Twisted Barbless Wire Cal	Merch. Wire Am'ld ¢/lb.	Merch. Wire* Galv. ¢/lb.
Alabama City *R3*	131	140		149	153	6.675	7.075
Aliquippa, Pa. *J3*	131	143			150	6.675	7.20
Atlanta *A8*	133	145		151	158	6.775	7.36
Bartonville *K2*	133	144			157	6.775	7.275
Buffalo *W6*							
Chicago, Ill. *N4*	131	143		149	156	6.675	7.20
Cleveland *A6*	137						
Cleveland *A5*						6.675	
Crawfordsville *M4*	133	145		151	153	6.775	7.325
Donora, Pa. *A5*	131	140		149	153	6.675	7.075
Duluth *A5*	131	140	145	149	153	6.675	7.075
Fairfield, Ala. *T2*	131	140		149	153	6.675	7.075
Galveston *D4*	139	148					
Houston *S2*	139	148			161	7.075	7.475
Johnstown, Pa. *B3*	131	143	145		156	6.675	7.225
Joliet, Ill. *A5*	131	140		149	153	6.675	7.075
Kokomo, Ind. *C9*	133	142		151	155	6.775	7.175
Los Angeles *B2*						7.625	
Kansas City *S2*	143	152		161	165	7.275	7.675
Minnequa *C6*	136	148	150	154	162	6.925	7.325
Monessen *P6*	131	145			157	6.675	7.225
Moline, Ill. *R3*			145				
Pittsburg, Cal. *C7*	150	163		173	173	7.625	8.025
Portsmouth *P7*						6.675	
Rankin, Pa. *A5*	131	140			153	6.675	7.075
So. Chicago *R3*	131	140	145	149	153	6.675	7.075
S. San Francisco *C6*					173		
Sparrows Pt. *B3*	133			151	158	6.775	7.325
Struthers, O. *Y1*						6.675	7.175
Worcester *A5*	137					6.975	
Williamsport, Pa. *S10*	133		158				

Cut Nails, carloads, base $8.00 per keg (less 20¢ to jobbers), at Conshohocken, Pa. (*A2*).

* Alabama City and So. Chicago don't include zinc extra. Galvanized products computed with zinc at 11.0¢ per lb.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled A-4615 As rolled	Alloy Bars: Hot-Rolled A-4140 Annealed	Alloy Bars: Cold-Drawn A-4615 As rolled	Alloy Bars: Cold-Drawn A-4140 Annealed
Baltimore	$.20	6.20	7.12 7.64	7.36 7.78	7.00		6.85	6.98	6.86	8.17				
Birmingham	.15	6.10	7.00	8.00[4]	6.30		6.35	6.35	6.15	8.90				
Boston	.20	6.89	7.83 8.38	9.18	7.13	9.35[2]	7.13	7.06	6.87	8.35	12.40	11.94 12.28	14.65	14.55 14.58
Buffalo	.20	6.18 6.20	7.15	8.70	6.65 6.79		6.65 6.68	6.55 6.59	6.35	7.70		11.95 12.15	14.45	14.25 14.55
Chicago	.20	6.18	7.12	8.00	6.42		6.33	6.46	6.28	7.30		11.60		14.05
Cincinnati	.20	6.30	7.11		6.66		6.62	6.93	6.52	7.60		11.85		14.30
Cleveland	.20	6.18	7.12	7.90 8.25	6.58		6.50	6.79	6.34	7.40	12.04	11.74	14.29	14.19
Denver		7.95	8.85	10.45 10.47	8.20	9.55	7.95	7.95	8.05	9.05				15.75
Detroit	.20	6.35 6.45	7.29 7.31	8.42	6.69 7.71	7.36	6.80	6.91 6.93	6.56	7.60	12.47	11.92	14.42	13.44 14.62
Houston	.20	7.15	7.45 7.60	9.23	7.45		7.20	7.35	7.45	9.30 9.40		12.80		
Kansas City	.20	6.85			7.09		7.00	7.13	6.95	8.07				
Los Angeles	.20	7.25	9.00	9.35	7.55		7.20	7.35	7.15	9.10 9.75		12.90		15.90
Memphis	.10	6.79	7.69		6.90		7.01	7.09	6.88	7.89 8.76				
Milwaukee	.20	6.35	7.29	8.17	6.59		6.50	6.63	6.45	7.57		11.77		14.22
New Orleans	.15	6.51	7.41	9.32	6.63	10.42	6.73	6.81 7.45	6.60	8.42 10.42				
New York	.30	6.78	7.75 8.37	8.41[7] 8.42	7.16	9.15[8]	6.99	6.90	7.06	8.43	12.29	11.99	14.54	14.44
Norfolk	.20	6.90			7.00		7.00	7.00	7.00	8.50				
Philadelphia	.25	6.35 6.53	7.13	7.87	7.02		6.63	6.67	6.87	8.19		11.74		14.19
Pittsburgh	.20	6.18	7.12	8.30	6.55		6.33	6.46	6.28	7.65		11.60		14.05
Portland	.10	7.90 8.75	8.45 9.75	9.05 9.15	7.65		7.30	7.25	7.35	10.65				
Salt Lake City	.20	8.60	10.50	10.50[3]	9.25		8.10	8.25	9.20	11.25				
San Francisco	.20	7.35	8.70	10.15	7.60		7.20	7.25	7.15	9.75		12.90		15.90
Seattle	.20	7.95 8.15	9.30 9.50	9.80	7.80 8.00		7.40 7.60	7.30 7.50	7.40 7.60	10.45 10.65		13.15		15.60
St. Louis	.20	6.48	7.42	8.25 8.30	6.72	7.70 8.53	6.73	6.86	6.58	7.70	12.20	11.90	14.45	14.30 14.35
St. Paul	.15	6.84	7.78 8.33	8.66	7.08	13.22	6.99	7.12	6.94	8.06		12.42		

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

Exceptions: (1)500 to 1499 lb. (2)20,000 lb or over. (3)450 to 1499 lb. (4)500 to 9999 lb. (5)1000 lb or over. (6)400 to 1499 lb. (7)1500 to 3499 lb. (8)2000 to 5999 lb.

C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn. *S7**	5.75	7.65	8.60	10.55	12.85
Carnegie, Pa. *S9*		7.65	8.60	10.55	12.85
Cleveland *A5*	5.45	7.65	8.60	10.55	12.85
Detroit *D1*	5.65	7.85	8.80	10.55	
Detroit *D2*	5.65	7.85	8.80		
Harrison, N. J. *C11*			8.90	10.85	13.15
Indianapolis *C5*	5.60	7.80	8.60	10.55	
New Castle, Pa. *B6*	5.80	8.00	8.60		
New Haven, Conn. *D1*	5.90	7.95	8.90	10.85	
Riverdale, Ill. *A1*	5.70	7.80	8.75	10.70	13.00
Sharon, Pa. *S1*	5.45	7.65	8.60	10.55	12.85
Trenton *R4*		7.95	8.90	10.85	13.15
Wallingford *W1*	6.20	7.95	8.90	10.85	13.15
Warren, Ohio *T4*	5.45	7.65	8.60	10.55	12.85
Weirton, W. Va. *W3*	5.45	7.65	8.60	10.55	12.85
Worcester, Mass. *A5*	6.30	7.95	8.90	10.85	13.15
Youngstown *C5*	5.45	7.65	8.60	10.55	

* Sold on Pittsburgh base.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	27.34	32.98	26.51	31.98
	2½	12	36.82	44.41	35.70	43.07
	3	12	42.52	51.28	41.23	49.73
	3½	11	49.63	59.87	48.13	58.06
	4	10	65.91	79.50	63.92	77.10
National/Tube	2	13		32.98	26.51	
	2½	12	36.82	44.41	35.70	
	3	12	42.52	51.28	41.23	
	3½	11	49.63	59.87	48.13	
	4	10	65.91	79.50	63.92	
Pittsburgh Steel	2	13	27.34	32.98		
	2½	12	36.82	44.41		
	3	12	42.52	51.28		
	3½	11	49.63	59.87		
	4	10	65.91	79.50		

—Miscellaneous Prices—

(Effective Apr. 13, 1954)

TOOL STEEL

F.o.b. Mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	5	$1.48
18	4	1	—	5	2.16
18	4	2	—	—	1.64
18	4	2	—	—	1.64
1.5	4	1.5	8	—	.895
6	4	2	6	—	1.005

High-carbon chromium ..... .70
Oil hardened manganese ..... .39
Special carbon ..... .355
Extra carbon ..... .30
Regular carbon ..... .25

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$111.80 to $115.30
6 to 24-in., del'd N. Y...	115.00 to 116.00
6 to 24-in., Birmingham	98.00 to 102.50
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	$129.50 to $131.50

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953, to end of 1954 season.

	Gross Ton
Openhearth lump	$11.15
Old range, bessemer	10.30
Old range, nonbessemer	10.15
Mesabi, bessemer	10.05
Mesabi, nonbessemer	9.90
High phosphorus	9.90

Prices based on upper Lakes rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

COKE

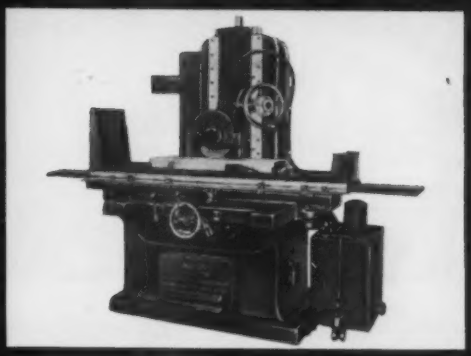
	Net-Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.25 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.50 to $17.00
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.95
Swedeland, Pa., f.o.b.	23.85
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed

GRAPHITE			CARBON		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	20.50	40	100, 110	8.95
20	72	20.00	35	110	8.95
12 to 18	72	20.50	30	110	8.95
7 to 10	60	21.00	24	72 to 84	9.10
6	60	23.25	20	90	8.95
4	40	26.00	17	72	9.10
3	40	27.25	14	72	9.50
2½	30	28.00	10, 12	60	10.30
2	24	43.50	8	60	10.55

When the need is for SPEED —and PRECISION



You need a

GRAND RAPIDS GRINDER

Here is extra value, extra accuracy, extra high-speed performance. Every Grand Rapids Hydraulic Feed Surface Grinder has a one-piece column and base for vibrationless rigidity and permanent alignment between cross travel ways and upright headways. Both longitudinal table travel and cross feed are hydraulically operated. On the larger machines, the wheel head is powered for rapid vertical travel. ***The model 55 has longitudinal table speed of 125 fpm.!***

All parts are machined to micrometric tolerances and precision assembled for perfect freedom of action and entire elimination of play. That's why 6 out of 10 of these machines are sold to firms already using Gallmeyer and Livingston grinding machinery.

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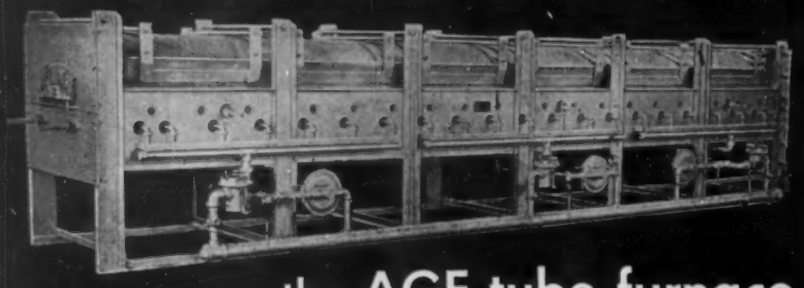
400 Straight Ave., Grand Rapids, Mich.
Please send me the following literature without obligation:

☐ Grand Rapids Surface Grinder Catalog
☐ Grand Rapids Universal Cutter and Tool Grinder Catalog

NAME
POSITION
FIRM
FIRM ADDRESS

No more "HOT" spots



the AGF tube furnace

model NO. 72

The Reduction of Oxides is very efficiently accomplished in this furnace because of the large number of small burners scientifically positioned to direct a uniform heat along the entire operating length of each tube. This prevents "hot spots" and provides longer tube life.

Other advantages are—

- RIGID ATMOSPHERE CONTROLS
- UNIFORM HEATING OF TUBES
- REMOVABLE ROOF TO FACILITATE ACCESS TO INTERIOR CHAMBER

Specifications —

Chamber length—20 ft., Capacity 6 tubes 2½" I.D.
Entrance is reg. 2" high, max. 4" x 20" wide.
Max. air—85 C.F.M. at 16 oz.
Max. Cons.—(525 B.T.U. Gas)—1000 C.F.H.

For the manufacture of metallic tungsten, molybdenum, etc., long tube furnaces are generally used having one or more tubes through which "boats" are pushed, containing the material to be reduced. Similar types of AGF furnaces are used for the hardening and annealing of steel or brass wire and wire strip.

AMERICAN GAS FURNACE CO.
1004 LAFAYETTE STREET, ELIZABETH 4, N. J.

Write for details and descriptions of AGF TUBE FURNACES.

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Put The Iron Age to work selling your product right away.

—Miscellaneous Prices—

(Effective Apr. 13, 1954)

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

	Pct Off List			
	Less Keg	K.	Less Keg	K.
	Reg.		Hvy.	
½ in. & smaller	+2	15	+2	18
9/16 in. & ⅝ in.	+7	11	+32*	+10*
¾ in. to 1½ in. inclusive	+8	10	+27**	+6**
1⅝ in. & larger	+9	9	+27	+6

* 9/16 to ¾ in.
** ⅞ to 1½ in.

Nuts, Hot Pressed—Hexagon

½ in. & smaller	11	26	8	23
9/16 in. & ⅝ in.	2	18	+20	net
¾ in. to 1½ in. inclusive	+6	12	+25	+4
1⅝ in. & larger	+8	10	+25	+4

Nuts, Cold Punched—Hexagon

½ in. & smaller	11	26	8	23
9/16 in. & ⅝ in.	9	24	+2	15
¾ in. to 1½ in. inclusive	+1	16	+9	9
1⅝ in. & larger	+16	3	+20	net

Nuts, Semi-Finished—Hexagon

½ in. & smaller	23	36	14	28
9/16 in. & ⅝ in.	18	32	4	20
¾ in. to 1½ in. inclusive	8	23	+8	10
1⅝ in. & larger	+14	5	+20	net
	Light			
7/16 in. & smaller	33	43		
½ in. thru ⅝ in.	26	37		
¾ in. to 1½ in. inclusive	18	30		

Stove Bolts *Pct Off List*

Packaged, steel, plain finished 44½—10
Packaged, plain finish ..... 25½—10
Bulk, plain finish** 59*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets *Base per 100 lb*

½ in. & larger $8.90
Pct Off List
7/16 in. and smaller 30

Cap and Set Screws

(In bulk) *Pct Off List*

Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	40
¾ in. thru 1 in. up to & including 6 in.	26
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	43
¾ in. thru 1 in. up to & including 6 in.	33
Milled studs	17
Flat head cap screws, listed sizes	12
Fillister head cap, listed sizes	7
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	37

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	4	20
9/16 in. & ⅝ in. x 6 in. & shorter	5	21
¾ in. & larger x 6 in. & shorter	3	19
All diam. longer than 6 in...	+4	13
Lag, all diam. x 6 in. & shorter	12	27
Lag, all diam. longer than 6 in.	8	23
Plow bolts	30	..

—Miscellaneous Prices—

(Effective Apr. 13, 1954)

REFRACTORIES

Fire Clay Brick	*Carloads per* 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$109.00
No. 1 Ohio	102.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	102.00
No. 2 Ohio	93.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	16.00

Silica Brick	
Mt. Union, Pa., Ensley, Ala	$115.00
Childs, Hays, Pa.	120.00
Chicago District	125.00
Western Utah	131.00
California	138.00
Super Duty Hays, Pa., Athens, Tex., Windham	132.00
Curtner, Calif.	150.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	19.00
Silica cement, net ton, bulk, Hays, Pa.	21.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	20.00
Silica cement, net ton, bulk, Utah and Calif.	28.50

Chrome Brick	*Per net ton*
Standard chemically bonded Balt.	$86.00
Standard chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick	
Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite	*St. ¾-in. grains*
Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	38.00
in sacks	43.75

Dead Burned Dolomite	*Per net ton*
F.o.b., bulk, producing points in: Pa., W. Va., Ohio	$14.50
Midwest	14.60
Missouri Valley	13.65

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content

72½%	$44.00
70% or more	42.50
60% or less	38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron, c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, del'd. in East	12.0¢
Domestic sponge iron, 98+% Fe, carload lots	18.0¢
Electrolytic iron, annealed, 99.5+% Fe	44.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	60.0¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	43.50¢
Copper, reduced	43.50¢
Cadmium, 100-199 lb	95¢ plus metal value
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	21.00¢
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$4.65
Zinc, 10 ton lots	17.5¢ to 25.0¢

OUTSTANDING IN SERVICE AND LOW PRICE

Series "D" 'Load Lifter' Cranes

You get by far the most crane value when you select from the line of Series "D" 'Load Lifter' All-Electric Cranes. Although built for average industrial service, they have performance - proved features made famous wherever "Shaw-Box" Heavy-Duty Cranes are installed.

Despite their superior quality and dependability, Series "D" 'Load Lifter' Cranes are priced surprisingly low. In manufacturing them, "Shaw-Box" applies modern standardization and mass production techniques — takes full advantage of more than 66 years of experience in building load-handling equipment exclusively. That is why you have the assurance of reliable performance, low maintenance and high economy. That is why you can select your Series "D" 'Load Lifter' Crane from a catalog.

Series "D" 'Load Lifter' Cranes are made in 1 to 20 ton capacities — floor and cage-controlled models. All have rigid *three-girder* bridge construction. All gearing operates in oil in sealed housings. Motor and drive shaft are permanently aligned. The bridge and trolley wheel axles rotate. All bearings are ball or roller bearings. Three basic types and three trolley styles available. Write for full details about today's greatest crane values. Ask for Catalog 221.

'Load Lifter'® CRANES

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Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' and 'American-Microsen' Industrial Instruments, and Aircraft Products.

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Hyde Park Red Circle Rolls are outstanding in quality and in performance and are easily identified by the Red Circle.

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Hyde Park
FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland County, Pa.
ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS

—Ferroalloy Prices—

(Effective Apr. 18, 1954)

Ferrochrome

Contract prices, cents per lb contained Cr, lump size, bulk, in carloads, delivered.

65-72 Cr, 2% max. Si.

0.025% C	34.50	0.20% C	33.50
0.06% C	34.50	0.50% C	33.25
0.10% C	34.00	1.00% C	33.00
0.15% C	33.75	2.00% C	32.75

65-69% Cr, 4.9% C 24.75
62-66% Cr, 4.6% C, 6-9% Si 25.60

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads 25.85
Ton lots 28.00
Less ton lots 29.50

High-Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C $1.18
0.50% max. C 1.14
9 to 11% C 1.11

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, bulk 2-in. x down, 24.75¢ per lb of contained Cr plus 10.80¢ per lb of contained Si.

Bulk 1-in. x down, 24.90¢ per lb contained Cr plus 12.69¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads 19.00
Ton lots 22.10
Less ton lots 23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads 20.00
Ton lots 22.30
Less ton lots 23.30

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 17.50
Less ton lots 19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 16.60
Ton lots 18.10
Less ton lots 19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed 17.50
Ton lots to carload packed 18.50
Less ton lots 20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 75 pct Mn:

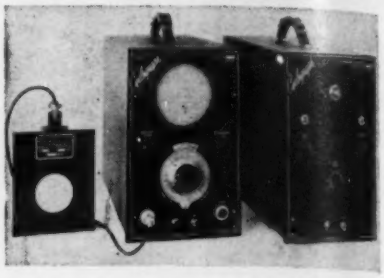
Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.00
Clairton, Pa.	10.00
Sheridan, Pa.	10.00

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 12.50
Ton lots, packed 14.05

It's Dice For The Best in Metal Test Instruments



The CYCLOGRAPH
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. . for unscrambling metal mixups

This instrument permits truly high speed, non-destructive sorting of raw, semi-finished or finished parts by their metallurgical characteristics. With the new Automatic Sorter Unit speeds up to 300 pieces per minute are possible with the use of suitable feeding equipment. Used by leading industrial firms everywhere.

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Non-destructive Testing and Measuring Instruments

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ELECTRICAL EQUIPMENT
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FARM IMPLEMENTS
Lansing Stamping Co.
"ESTABLISHED 1914"
LANSING 2 MICHIGAN

—Ferroalloy Prices—

(Effective Apr. 13, 1954)

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	36.95
Ton lots	38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Less than 250 lb	37.00
Premium for hydrogen-removed metal	1.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	30.00	31.85	33.05
0.07% max. C	27.95	29.80	31.00
0.15% max. C	27.45	29.30	30.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet	12.65
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $89.50. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton Lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.30
Ton lots	7.90

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	13.80
50% Si	10.80	85% Si	15.55
65% Si	12.20	90.95% Si	17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

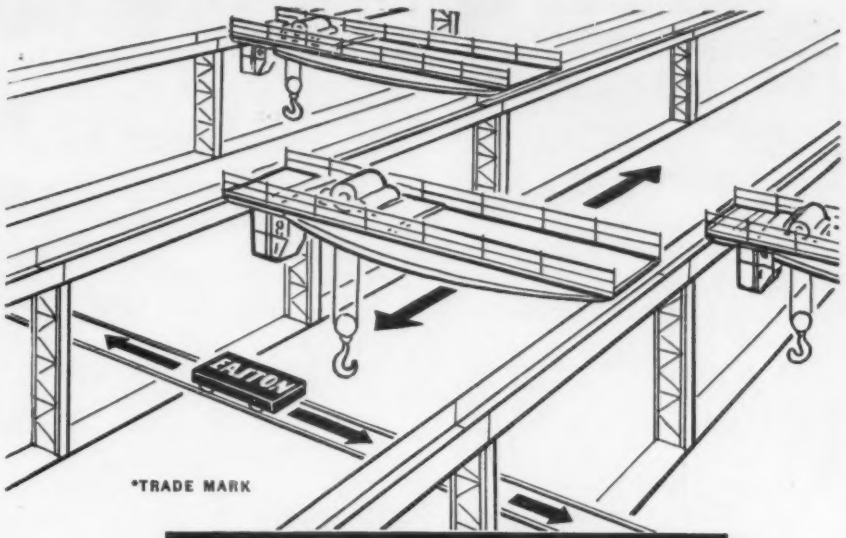
Ferrovanadium

35-55% contract basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Cross-Bay*Transfer

Automatic motor-driven transfer cars provide a universal handling system in modern parallel bay plants now served by overhead cranes. Also for transfer between plant buildings.



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in inch ounces . . . inch pounds . . . foot pounds
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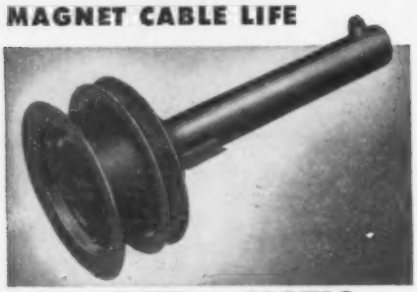

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More Magnet Loads per day!

Rud-o-Matic Combination Magnet Reel-Tagline saves expensive electric cable wear on overhead and boom crane jobs. Tension on the steel tagline cable keeps the strain from the expensive electric magnet cable. Now standard equipment with major crane manufacturers, the Rud-o-Matic Combination Magnet Reel-Tagline is made in five models to fit your present equipment. Insure complete tagline control on *your* crane with Rud-o-Matic!

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McCAFFREY-RUDDOCK TAGLINE CORP.
2131 E. 25th St. • Los Angeles 11, Calif.

—Ferroalloy Prices—
(Effective Apr. 13, 1954)

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis f.o.b. Suspension Bridge, N. Y.
Carloads 9.90
Ton lots 11.30

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.15

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.
Ton lots $9.50
Less ton lots 9.55

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30% C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $4.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo $1.32

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagra Falls, N. Y., and Bridgeville, Pa., freight, allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.55

Ferrotitnnium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W. ton lots, f.o.b. $3.80

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢

Vanadium Pentoxide, 86 - 89% V_2O_5 contract basis, per pound Contained V_2O_5 ..... $1.25

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 8.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound ... 50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, Ton lots ... $1.20
F.o.b. Wash., Pa.; 100 lb up
10 to 14% B ..... .85
14 to 19% B 1.20
19% min. B 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over
No. 1 ..... $1.00
No. 6 ..... 63¢
No. 79 ..... 50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
Ton lots $1.46
Less ton lots 1.57

Nickel - Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max C, 3.00% max. Fe, balance Ni, delivered
Less ton lots $2.05

Silcaz, contract basis, delivered
Ton lots ..... 45.00¢

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